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The AUTOMOBILE

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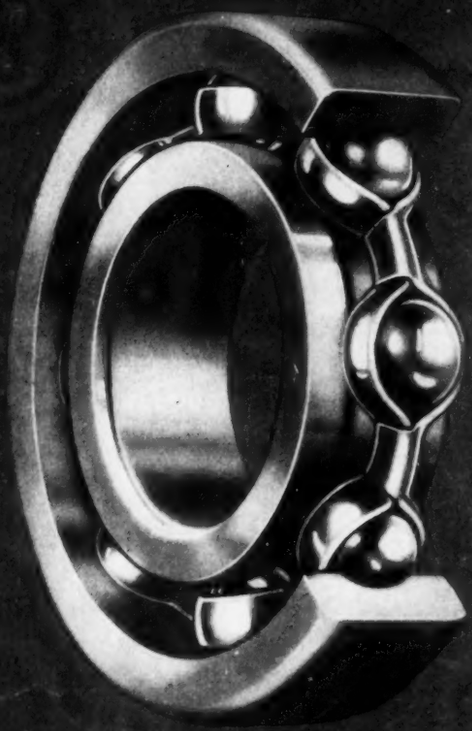
—but what about the Bearings?

You buy the best gears in order to achieve a silent, smooth-running mechanism. But what about the bearings? Are you wasting the money spent in fine gears by using cheap bearings that permit shaft misalignment and noisy meshing?



THE FAFNIR BEARING CO.
Detroit New Britain, Conn. Chicago

FAFNIR
BALL BEARINGS

Entered as second-class matter Jan. 2, 1903, at the post office at New York, N. Y., under the Act of March 3, 1879

The Ricardo Head

THIS is the real significance of the success of the Ricardo Head: that advanced engineering has developed a type of motor that enjoys complete immunity from all detonation and reaches an entirely new standard of engine performance.

Waukesha Motor Co.

Engine Builders

Waukesha, Wis. New York City

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. 52 NEW YORK—THURSDAY, FEBRUARY 19, 1925 No. 8

Waste in Advertising

Find It and Stop It!

By Harry Tipper

IF every piece of advertising produced a possible buyer, that advertising would be working at 100 per cent efficiency. There wouldn't be any waste.

But everybody knows that such an ideal condition never has existed. Waste occurs in every advertising campaign. Some of it is unavoidable; some of it is avoidable.

Much of the waste is so obscure that it's hard to trace and harder to stop. But a good deal more can be accomplished in plugging up the leaks than has been achieved in the past. Advertising does not deal in mathematical nor mechanical quantities and the factors which make for its success or failure, consequently, are difficult to master. A few rules, however, simple in character and broad in operation, can be used to measure the waste in any advertising.

1. **Any piece of advertising which does not reach a possible buyer of the product is waste.**
2. **Any piece of advertising which makes no impression upon the buyer is waste.**
3. **Any piece of advertising which results in an impression so feeble as to be lost in the confusion of attention is waste.**

Beyond these there are the less measurable, but no less obvious wastes connected with the character of the advertising. These are:

First—Any advertisement which does not produce a definite increase in the favorable attitude of the possible buyer is waste.

Second—Merely by the reiteration of the name, the product and the organization advertising can produce some impression. It may eat its way finally into the minds of some of the buyers by, as Matthew Arnold says, "Beating it upon our weary brains like the hawker." To secure only this value represents the minimum of efficiency and intelligence in the advertising used.

It must be remembered that the preacher who fills the same pulpit for twenty-five years without making a visible convert, uses the same language, although with different effect, as the revivalist who turns the town upside down in six weeks. The advertiser who introduces his name, his product, and his organization, without creating any further impression except a degree of familiarity, is using the same paper, ink and dictionary as the advertiser who startles the market into gossip and interest within a few weeks.

It is necessary to distinguish between the interest engendered by the product itself and that aroused by the advertising. The automobile is an interesting product and anything pertaining to it is interesting. Changes in the vehicles

"AT some future time advertisers will look back on the practice of using the same piece of advertising copy for all kinds of audiences as a bit of inefficient crudity, justified only by lack of knowledge," says Harry Tipper in this striking analysis of waste in advertising.

The article is the thirteenth of a series on "Profits vs. Volume."

Mr. Tipper tells how waste can be reduced and how greater efficiency can be obtained in automotive advertising.

are interesting in themselves. This interest may be heightened or lowered by the character of the advertising but it cannot be displaced, and the advertising effect must be separated from the interest which already exists. Some of the wastes which are mentioned are unavoidable wastes; some of them are avoidable and could be escaped much more often than at present.

Getting Attention

We appear to think that it is possible to use any method of advertising and produce an interest out of any group of people without distinguishing the applicability of the methods and the circumstances and interest of the group. It is apparent from the character of the advertising that we have a hazy notion that public opinion is something more than an aggregation of individual opinions, and that widespread publicity can in itself create favorable interest without respect to what it says and how it says it.

Any advertisement competes with every other advertisement in interest quite apart from the competition between products. When the volume of advertising was small and the number of advertisers few, this waste was not important. Today the use of advertising is general, the volume of advertising is large and the buyer is put to great trouble to select out of the vast number clamoring for attention the few matters in which he desires to be interested. Even the physical job of looking at or reading the amount of advertising material offered is too much for the average person. Consequently circular letters remain unopened, pages of publications are not turned over, signs become interesting only because they hide the scenery and there arises an automatic protection against the clamor of advertising in the form of an automatic refusal of attention.

It is a part of the business of the advertiser to know how much waste is involved in any advertising method in relation to its cost. It is a part of his business to know the relative importance of different groups of people which comprise his market. It is a part of his business to know their interests and the time at which these interests can be used to the advantage of his organization.

Cutting the Cost

If a manufacturer were offered two machines, one of which cost ten times the price of the other, the efficiency of operation of the high priced one would have to be correspondingly large to justify its purchase. Obviously then, if one advertising method costs ten times as much as another method in reaching the individual, it should be ten times as efficient, if the cost is to be justified. Even when the advertiser is careful to reach the right groups and to present the right material, he frequently wastes a good deal of money because he does not select the least expensive and most suitable method for reaching that particular group.

The accompanying illustration showing the unopened mail taken from the waste basket of a dealer in a town of about 1200—the week's selection of waste matter going to the scrap pile without any attention whatsoever—gives a striking visualization of one kind of waste. In this pile are house organs, circulars, envelope stuffers, letters and postalcards, all of which have cost the manufacturer money to produce, and all of which are wasted in this particular instance. This same sort of waste is going on all over the country in thousands and thousands of establishments all the time. A manufacturer whose success with window display material is considered almost phenomenal could only secure evidences of the use of 25 per cent of the material. In other words, as far as he knew, 75 per cent had gone to waste.

A retailer in a town of 10,000 showed the writer recently display material from manufacturers which would have required him to change his counters and windows from two to three times a week in order to use it. Needless to say, a lot of this material was baled for the waste paper man.

A manufacturer who has not produced more than several thousand cars a year for the space of three years, spent a large part of his advertising money in reaching from three to four million people. Granting that every advertisement which did not reach a possible buyer is waste, the percentage of waste in such a program was enormous.

Advertising Integral Part of Selling

The function of advertising is to do a certain part of the work of marketing in the mass, because it is cheaper and almost as effective to do it that way. It should, therefore, coincide with the marketing program of the manufacturer in other directions. It is a function of marketing and its policy should be considered as carefully as the rest of the marketing program. No manufacturer would think of taking his sales force entirely out of their present areas and methods of sale and pitching them into new areas with new methods. But a number of manufacturers suddenly have switched their main program of advertising from one method to another as though the change had very little relation to the marketing problem as a whole. In fact, changes in advertising policy have been quite frequent and drastic and have been accompanied many times with apparently only superficial examination.

Advertising is a sales effort regardless of whether it is selling the product, the organization or the name, and as a sales effort it should be judged in the same way as the sales organization.

In setting up his sales staff, the manufacturer first will see that the direct customers are covered; that he has arranged to take care of the most productive territory, which his volume requires, and in which he has the strongest competitive advantage. He sets up his sales organization to keep a contact with those who actually can order from him, to arrange his distribution and to see that the distributing elements are kept in good shape. In this essential market the advertising should be used from the beginning most effectually and continuously.

The manufacturer does not start his sales work by setting up a sales organization to visit all those who might possibly use the product, expecting later to organize his lines of distribution and so gradually work back to the point of sales; yet many advertisers have

On its way to the waste basket. Here is the mail thrown away in a single week by one small town dealer. It visualizes the competition which has to be met by every piece of direct-by-mail literature sent out in the automotive industry

arranged their advertising affairs in just this roundabout way. They have appealed to the ultimate user before securing distribution and have neglected distribution while they have cultivated the ultimate user.

The selection of advertising methods is subject to the same elements of examination and criticism. No business man would put up a sign on the front of his building and expect it to take the place of a printed booklet, neither would he send a booklet in the attempt to answer a letter, nor would he expect a letter to serve the purpose of a personal interview. Nevertheless, advertisers have been known to change from direct mail to billboards and from publications to booklets, just as though these methods serve the same purposes and could produce the same results. As a matter of fact, various methods of advertising are suitable to different purposes; they cannot be substituted without losing efficiency or wasting effort.

In the selection of publication media, the advertiser should borrow from his other experience to determine the possibilities and valuation. The author knows that he cannot submit an article written on one subject and in one style to a publication devoted to other subjects and other styles. The editor is too well acquainted with his audience and their reasons for subscribing. Yet the advertiser conducts his work many times as though this distinction did not exist. He persists in trying to induce the subscriber who has bought a publication for entertainment to read advertising of a scientific or technical nature. He tries from time to time to get the engineer in his engineering publication to read advertising intended for the layman, although this very effort reduces the possible interest to the minimum. No sane chairman would introduce a discussion of music into the middle of a medical session, even though many of the doctors were musicians, but this illustration is no more farfetched than the actions of many advertisers.

Customers of the manufacturer are, in their relative order of importance: first, those who actually buy from him; second, those who sell to the final user; third, those who use the article. This is the order that is important in the developing of his advertising method.

As in other problems of the manufacturer, the endeavor in the advertising should be not "less advertising," but "more profitable advertising," because more intelligently applied.

Two Body Models Comprise New Cleveland Six Line

Powerplant is L-head type with bore and stroke of 2⅞ x 4¼. Four wheel brakes are optional at added cost. Chassis oiling system is one-shot type similar to that used on older model.

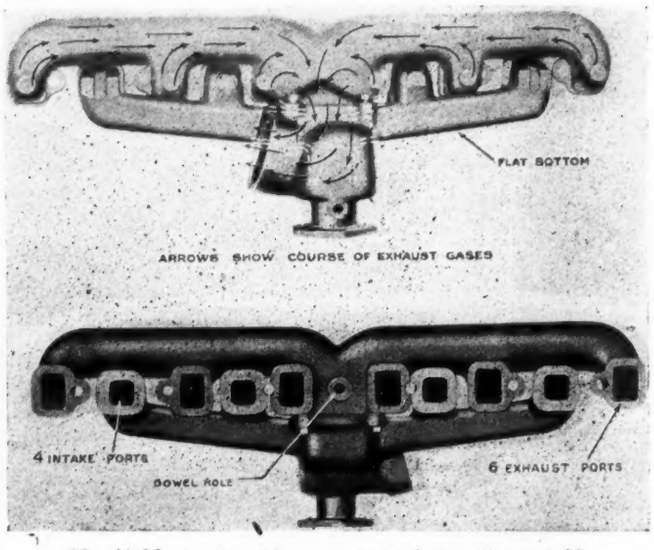
By Donald Blanchard

CLEVELAND has entered the low-priced, six-cylinder field with a new and smaller car, which was displayed for the first time at the New York Show. The new line, which is called the Series 31, consists of a phaeton and a sedan, both seating five passengers and listing at $895 and $1,195 respectively. One-shot chassis lubrication and 30 x 4.75 balloon tires are included in the list price, and mechanically operated four-wheel brakes may be had at additional cost.

Both body models are finished in sage brush green Duco and have a gold-striped, black belt line molding which is carried forward to the radiator shell. The tops, fenders and aprons are black. Leather upholstery is used in the open model and taupe worsted in the sedan. The latter model is fitted with dome light, sun visor, windshield wiper and nickel plated radiator shell.

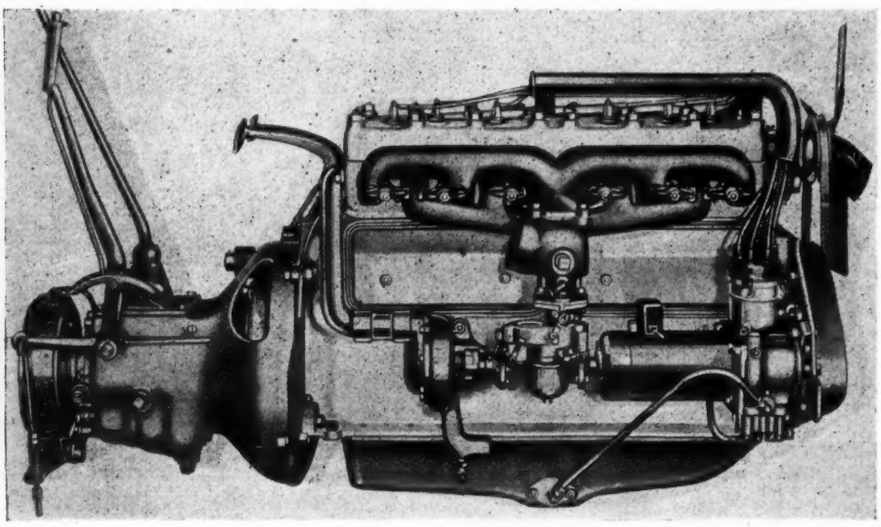
The engine in the new car is about 25 per cent smaller than the power plant in the Series 43, the respective piston displacements being 165.5 and 218.6 cu. in. The cylinder dimensions are 2⅞ x 4¼ in., giving an N. A. C. C. rating of 19.8 hp. Actual maximum output and torque are said to be 45 hp. at 2500 r.p.m. and 118 lb.-ft. at 1050 r.p.m. respectively.

Crankcase and cylinder block are cast in one block of cast iron and the detachable head is of the same material. Both the timing chain compartment cover and the oil pan are steel stampings. The engine is supported by two transverse, 3/16-in. steel plates, the ends of which are bolted to brackets riveted to the frame side rails. The front supporting plate is located between the crankcase and the timing cover, and the rear between the case and the bell housing. To secure rigidity, the crankcase is carried down about 3 in. below the center line of the crankshaft.



Manifold construction as seen from the outside and from engine side

The crankshaft is a carbon steel forging supported in three die-cast babbitt bearings, the center one being flanged to take the thrust. The dimensions of these bearings, diameters and lengths respectively, are 2 3/16 x 2⅛ in., 2 3/32 x 2⅜ in., and 2 x 2½ in. Connecting rods also are carbon steel forgings, with a center to center length of 8½ in. The big end bearings are babbitted in place and are 1⅞ in. in diameter by 1⅝ in. long. The piston pins, which are ⅞ x 2½ in., are locked in the rods and have their bearing in bronze bushings in the cast iron pistons. The pistons have two ⅛-in. plain rings and a 3/16-in. oil ring, all located above the pin.



Cleveland Series 31 powerplant, valve side

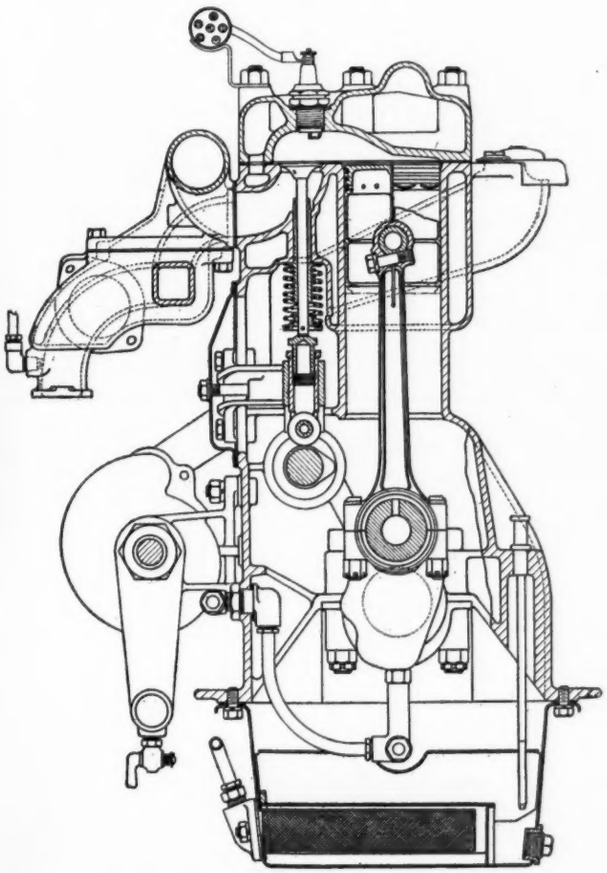
Front end drive is by a 1¼-in. Morse chain, both the camshaft and accessory drive sprockets being on the right side of the engine. The camshaft is supported in three cast iron bearings of the following dimensions:

	Length Inches	Diameter Inches
Front	2 5/16	1 3/8
Center	1 15/16	1 15/16
Rear	1 7/16	1 27/32

The thrust is taken by a flange on the camshaft at the front bear-

ings. Valves are actuated through roller tappets which are mounted in groups of six in easily removable blocks studded to the side of the cylinder block. Double valve springs are used to reduce the load on the camshaft when the valve is closed and to increase the load when the valve is open. The valves have a clear diameter of 1¼ in. and a 5/16 in. lift. They have cast iron heads on steel stems. The combustion chamber is designed to induce turbulence in the compressed mixture.

Oil pump, distributor, generator and water pump are mounted on the right side of the engine. The shaft of the driving sprocket is supported by a bracket in the rear of the timing chain housing. Adjustment of the chain tension is effected by swinging this bracket.



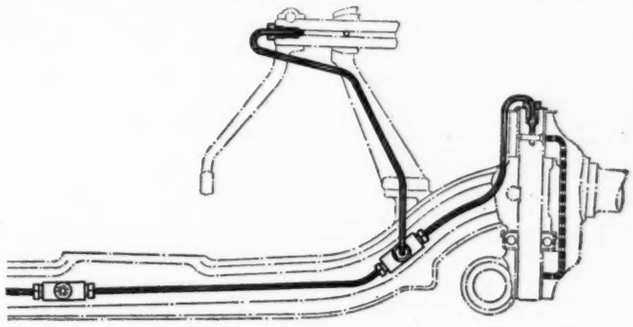
Cross section through Cleveland Series 31 engine

The oil pump is mounted on the bottom and the distributor on the top of this bracket and both are driven from the sprocket shaft by a pair of helical gears. The generator is mounted on the rear of the bracket and is driven from the sprocket shaft through a tongue and groove coupling. The water pump, which is supported by the crankcase, is driven from the rear of the generator through an intermediate shaft with a flexible coupling at each end. Any of these accessory units may be removed without disturbing the others.

Pressure lubrication is provided at all main, connecting rod and camshaft bearings. Before entering the external lead to the oil pump, the oil in the base of the crankcase is drawn through a cylindrical wire screen which is made readily accessible for cleaning by the removal of a plate on the side of the oil pan. The pump delivers the oil to a fitting on the center main bearing cap, from which tubes lead to the front and rear bearings. The crankshaft is drilled for lubrication of the crank pins, and ducts in the main bearing webs lead to the camshaft bearings.

The fuel system includes the Stewart vacuum system and a 1-in. Johnson type H carbureter. The manifolding is shown in one of the accompanying illustrations.

Clutch and transmission are mounted with the engine to make up a unit power plant. The former unit is a

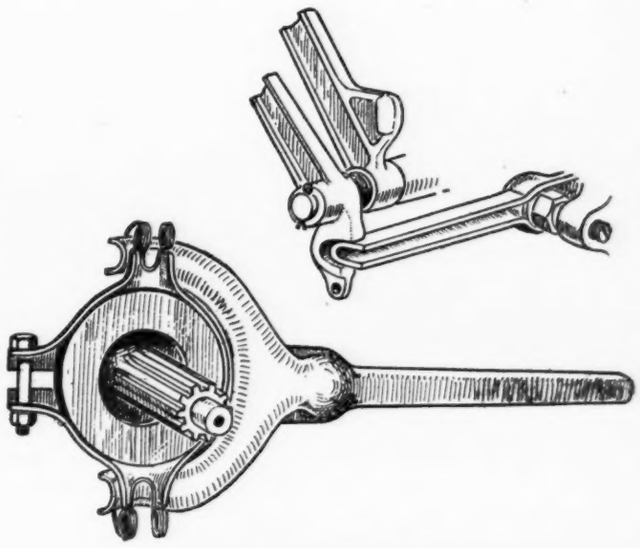


Application of the "one shot" lubrication system to front axle

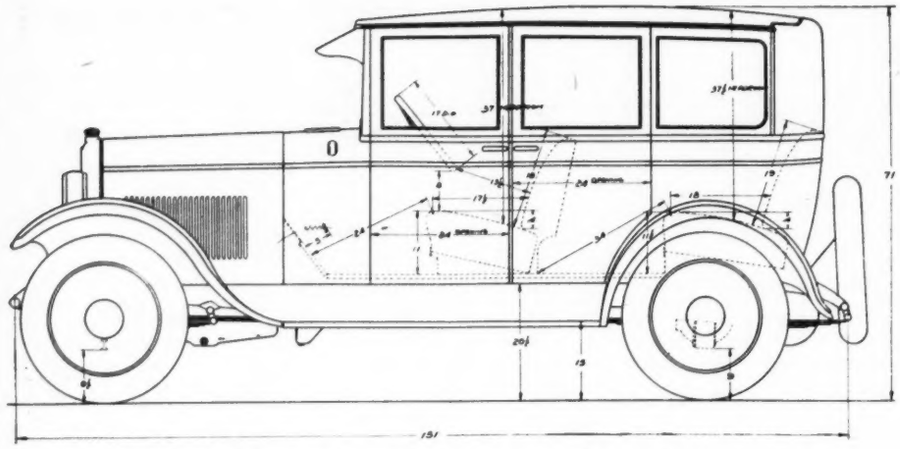
9-In. Borg & Beck push type. The throwout bearing is an annular graphite block and the pilot is a bronze bushing. The graphite block is clamped in a pressed steel cup which is mounted in the forked end of the throwout lever, which is also a steel stamping. This lever is fulcrumed on a ball-ended stud mounted in the bell housing. Adjustment for wear is secured by means of this stud, the setting being fixed by means of a lock nut. This adjustment is accessible from the outside of the bell housing. The main shaft of the three-speed transmission is supported in ball bearings at both ends and has a bronze pilot bushing. The countershaft is supported in bronze bushings. The external emergency brake is supported from the rear of the transmission case, which is integral with the bell housing.

Semi-floating Rear Axle

The drive to the rear axle is through a 1¾-in. tubular propeller shaft with two fabric universals. The rear axle is a semi-floating, helical bevel design providing a reduction of 4.9 to 1. Timken roller bearings are used on the pinion shaft to support the differential and at the wheels. The axle housing is of the banjo type and the



Sketch of pressed steel lever and link connecting clutch pedal with clutch collar



Side elevation of five-passenger sedan model

pinion clearance may be adjusted from the outside of the axle. The inner ends of the axle shafts are splined, and the axles may be removed without disturbing the differential. The reduction gears are 5½ pitch and have a 1⅛-in. face.

The front axle is a reverse Elliott type, with ball thrust bearings at the knuckles. A reduction of 10 to 1 is provided by the steering gear, which is a C. A. S. worm and sector type. Ball type joints are used throughout the steering linkages. Semi-elliptic springs are used front and rear, the respective sizes being 34 x 2 in. and 50 x 2 in. Heavy coil springs on the spring bolts maintain the adjustment at these points. Rear axle torque and propulsion are taken through the springs. The four-wheel service brakes are of the same design as used on the Series 43, except that the two brake cross shafts are supported just forward of the cross-member at the rear spring brackets. In the larger model the front brake cross shaft is suspended from a member which joins two of the running board hangers. The frame is pressed from 5/32-in. stock and the side rails have a maximum depth of 5 in. with a 1¾-in. flange at the top and a 1⅞-in. flange at the bottom.

Why License Number Plates Should Be Standardized

EFFORTS are being made by the Division of Simplified Practice, U. S. Bureau of Commerce, to get all of the States to agree on standard number plates for automobiles. Standardization of slots for number plate brackets is now under consideration by the S. A. E., but owing to lack of uniformity in plate dimensions it was found necessary to specify slots 3 in. long so the brackets will take the plates of practically all States. If the plate punchings were standardized, slots ½ in. long or even round holes would be sufficient, which would make the brackets both lighter and stronger.

The form and size of the numerals are selected for legibility, and at present there is considerable diversity in regard to these features. A comparison of the different designs now in use should give a good idea as to the best type and size of numerals and the best spacing.

The gage of metal used for the plates now varies from No. 14 to No. 26, which is an extremely wide range, considering that all of the plates serve exactly the same purpose. The lightest gage which meets all requirements of stiffness and durability would seem to be the most desirable, and experience had with the different gages should make it possible to determine this quite accurately.

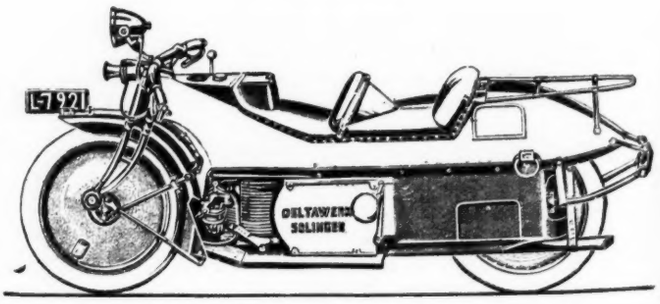
Stampings for the plates vary all the way from 8 to 20 in. in length and from 4 to 6 in. in width. Advantages would accrue from two different sources if a standard size of plate were adopted. It would not be necessary for a manufacturer contracting for the delivery of plates to several States to make separate dies for each job, so that there would be a saving in the cost of dies, and, besides, the plates could be made of such a size as to be punched most economically from one of the standard sizes of sheets which have been adopted recently.

At the present time different codes of numbering are in use in the different States. If a single code were adopted it would make the plates more serviceable as means of identification.

One code that has been suggested to make it easier to read number plates is to use one letter of the alphabet together with a number. By this system it is possible to care for 259,974 licenses with numbers up to 9,999, and for nearly 2,600,000 licenses with numbers up to 99,999.

R. P. Brannigan of the Automobile Chamber of Commerce has suggested that instead of using only the numerals 1 to 9, these numerals, together with all of the consonants of the alphabet, should be used in marking number plates. This would mean that there would be 29 license plates with only one symbol, 841 with no more than two, 2439 with no more than three, 707,281 with no more than four, and 20,511,149 with no more than five symbols. In the great majority of the States only four symbols would be required.

Standardization of license plates would help the car builder in providing a standard location for them, a standard method of mounting them, and a standard method of illuminating them, with a standard degree of illumination. It simplifies the plate makers' task and it ought to help the State purchasing agent in the annual purchase of his supply of plates. Most important of all, the traffic officers would be aided in their work.



Drawing of a light motorcycle which attracted a good deal of attention at the recent Berlin show. Among its features of interest are a pressed steel frame, single cylinder horizontal engine of 3 in. bore by 4½ in. stroke, camshaft on the cylinder head, circulating lubrication, three speed transmission combined with engine, leaf springs at front and rear, with snubbers and seats for two in tandem

Just Among Ourselves

Did Advertising Reduce Noise in Car Engines?

WE got to thinking it over the other day and finally came to the conclusion that a bit of exaggeration in advertising now and then may have good as well as ill effects. F'rinstance, take noise in motor car operation. The advertising managers wrote descriptions of noiseless vehicles for so long that the engineers finally went to it and built a car like the descriptions. The result has been less noisy engines every year for some time back. The public has been told to expect quiet operation in an automobile. Consequently the automotive engineer is up against harder problems than are technical men in some other fields.

It's All in What You Are Looking For

WE talked to an automotive engineer this week who had just come from Detroit to New York by Pullman. "The stateroom door rattled," he said, "squeaks arose from all sides and various other parts of the car radiated noise almost constantly. Weight isn't nearly so vital a consideration in designing a Pullman car as in building an automobile, yet the public wouldn't for a minute put up with the vehicle noise in a passenger car that it accepts as a matter of course in a Pullman. It has been educated to have quiet automobiles, and no one has told it to expect quiet in a railroad train. Great is the power of the printed word!

Quiet Times Should Be Thinking Times

WE sat down the other night to re-read Arthur Pound's "The Iron Man in Industry," which brought again to our mind that mere surplus of labor and consequent lack of acute industrial troubles doesn't have anything to do with permanent solution of the problem of human relations in industry. The last two years have produced relatively little talk about labor problems as related to adjustment of the worker to his task and the task to the worker. Probably that doesn't mean that thought on the subject has been stagnant. Let's hope not anyhow. As Pound remarks, "America's high duty is to guide the continuing evolution of the Iron Man (the machine tool) intelligently."

Desires Not Governed By Business Cycles

MEN'S desires, passions and ambitions continue to function fundamentally in the same way whether times are good or bad; only the superficial reaction changes with the business cycle. When the labor situation isn't acute, a good chance is given executives to think clearly and quietly about human relations. All of which leads us to say that in the great array of books published in the last five years dealing with this subject, three of them appeal to us as forming an excellent basis for executive thinking on the subject. Pound's volume is one of them; Harry Tipper's "Human Factors in Industry" is another; and Ordway Tead's "Instincts in Industry" is the third. These three authors don't agree with one another on many points, but all of them are stimulating and thorough.

Billiard Balls and Ball Bearings

EVENTS in the automotive industry have proved time and time again that the man with ideas is the basis of progress. Sometimes, of course, the idea man doesn't follow through to their logical conclusion all the new thoughts which enter his head, but after all he is the basis of advancement in engineering, sales and production. If he has a practical as well as a theoretical vision, so much the better; then he can be depended upon to turn his ideas into immediately useful channels, whether they follow the course originally laid out or not. It is said, for example, that the invention and development of one of the most widely known ball bearings on the market today resulted from an attempt to perfect a billiard ball, made of some substance other than ivory, which would not wear out and which would resist the effects of heat and cold. The billiard ball idea didn't work out, but the ball bearing resulted. Later, the story runs, this inventor made enough money out of the ball bearing to enable him to go ahead with further billiard ball experiments which were carried to a successful conclusion by the development of a ball made from a silk composition. Useful ideas for automotive development may come from many varied sources. Watch for them.

Best Buyer Won Sales Prize

THIS came to us as a true story. Believe it or not. "I visited a car dealer establishment up in New York State to get an interview with a star salesman who had just won the national factory prize for selling the most cars in the previous twelve months," the story teller relates. "'He's upstairs,' the dealer told me. 'Go on up and see him.' I did. There sat a little, sloppy looking man with a sad face. His hair was mussed, his tie awry and his shirt cuffs dirty. 'How did you put over this great sales record?' I asked. 'Aw, there's nothing much to it,' he said, 'We give bigger trading allowances than anybody else.' And that's the end of the story." Such is fame. N. G. S.

New Motorcycles Improved in Design, Reduced in Price

Models exhibited at New York Show reflect trend of design toward lighter machines to facilitate handling. Greater protection for riders also considered.

By Leslie S. Gillette

A DEFINITE attempt to meet the demand for lighter and more easily handled motorcycles, a trend toward lower prices, design providing greater protection for the rider and use of more durable finishes were the chief features of the eleventh annual Motorcycle, Bicycle and Accessory Show, held at the 71st Regiment Armory, New York, Feb. 9 to 14.

Entirely new models were shown by Cleveland, Excelsior, Neracar, and B. S. A., the latter make being of British manufacture.

Four producers announced price reductions ranging from $5 to $25, while every maker is including more extras and refinements as standard equipment than ever before.

More than 15,000 people attended the exhibition, which was staged by the Motorcycle and Allied Trades Association.

As at the recent national automobile shows, there was a decrease in the number of vehicle and accessory exhibits. Introduction of several entirely new models of motorcycles, as well as the showing for the first time of foreign machines, drew an unusually enthusiastic throng. A feature new this year was the allotting of booths, free of charge, to the important metropolitan motorcycle clubs. This had the effect of stimulating greater interest in the development of the motorcycle for recreation and attracting prospective members and riders.

Duco finish, similar to that used by the automobile manufacturers, has invaded the motorcycle field, two makers having adopted this as the standard paint job for their machines, the entire frames, tanks and wheels being so treated.

Cleveland has introduced a four-cycle model to supplement the two-cycle machine. The latter remains unchanged except for Duco gray lacquer finish, a lower low gear ratio and a few other detailed refinements.

The new model, which has a four-stroke motor, has the same general appearance as the two-cycle type. It is powered by a single cylinder, L-head, vertical air-cooled engine with a bore of 2¾ in. x 3 37/64 in., giving a piston displacement of 21.25 cu. in. The valves are arranged side by side, the operating mechanism being totally inclosed and effectively lubricated. A cast-iron piston with two rings and roller bearings in the lower end of the connecting rod are employed.

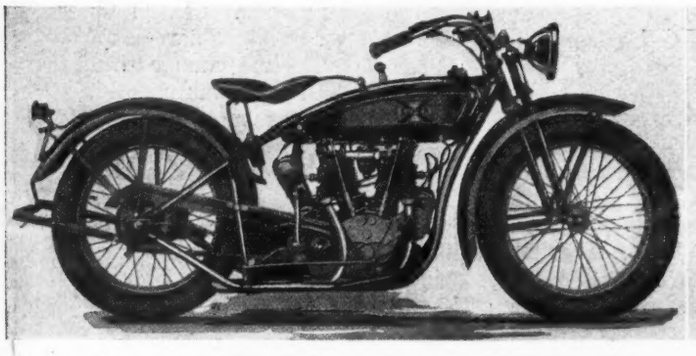
Clutch Control on Handlebars

The dry-plate multiple disk clutch is mounted directly on the worm gear shaft, transmitting the power from the engine to the chain sprocket, which in turn is connected to the rear wheel by a Diamond ⅝ in. x ¼ in. roller chain. The clutch is controlled by a lever on the handle bars, while the throttle and spark are operated by means of twist grips. Schebler carbureter, Bosch high-tension magneto, Splitdorf generator and Wico battery are standard equipment. The front fork, which is a special Cleveland design having one large helical coil spring, is mounted on the frame of 13-gage cold drawn seamless steel tubing with drop forged connections. The wheelbase is 56 in. and tire size 26 in. x 3 in. The finish is in Sage green Duco with all nickel fittings.

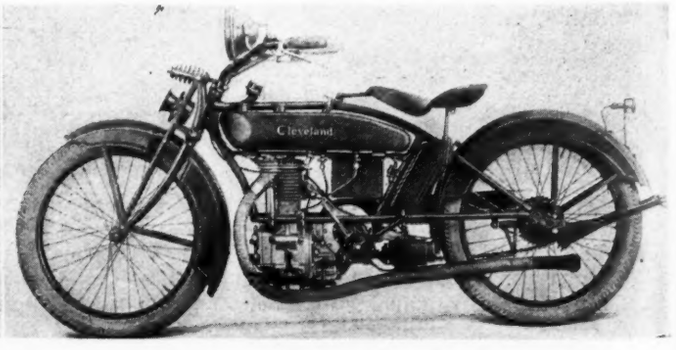
Evans has made few changes this year other than adoption of nickel-plated fittings. Prices have been reduced $20, the present list being $120.

Excelsior introduced its "Super-X" for the first time. The new model, although considerably smaller, resembles in many respects the "Big-X" which, although not exhibited, will still continue to be manufactured, especially for the export market.

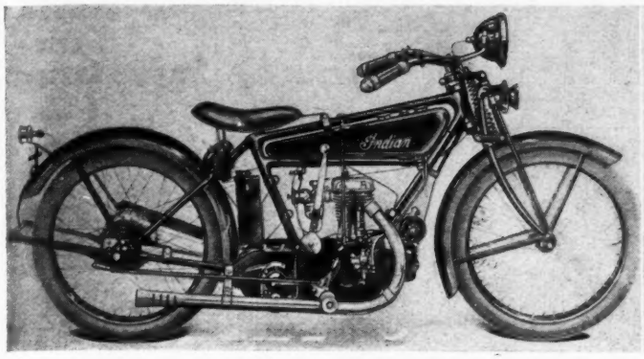
The engine, clutch and transmission of the new machine are built into the crankcase, making a strictly unit powerplant. This allows the use of gears instead of chain for primary drive.



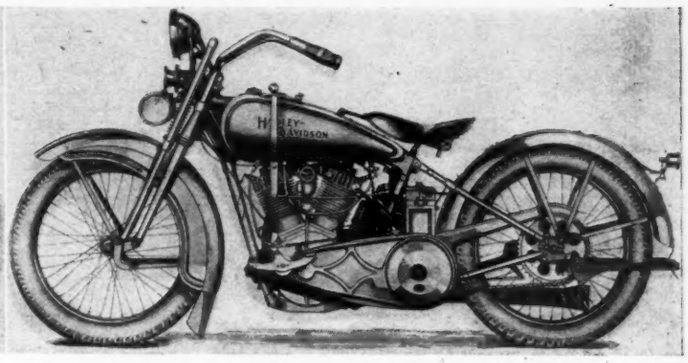
New "Super-X" Excelsior model, showing unit powerplant and balloon tires



A long exhaust pipe acting as a muffler is a feature of the new 4-cycle Cleveland



The single-cylinder, electrically equipped Indian "Prince"



New "Streamlined" Harley-Davidson, showing low saddle position

The two-cylinder V-type F-head motor has a bore and stroke of 3 in. x 3 7/32 in., giving a piston displacement of 45.0 cu. in. The cylinders have an unusual amount of radiating surface, especially around the exhaust valve pockets. The inlet valve cage is secured by three bolts instead of being screwed in as usually is done. The new construction makes it possible to remove the cages easily, even though they be badly caked with carbon. Pistons are of cast iron with three rings above the pins, the connecting rods are of trussed web design with roller bearings in the big ends, and roller bearings are employed in mounting the crankshaft. Equipment includes a special type of Schebler carbureter and a two-unit Splitdorf magneto and generator.

A multiple disk clutch running in oil is actuated by a single cam arrangement, control being by a heel-and-toe pedal on the left side. The transmission is of the three-speed automobile type, with oversize gears carried on heavy annular ball bearings which transmits the final drive to the rear wheel by a Duckworth chain.

Double Cradle Type Frame

The frame is of the double cradle type, similar to that of the Henderson. It is made of seamless tubing with special forged and reinforced joints, giving the motor three point suspension. Balanced plunger type straight line front forks with forged rockers carry the front wheel. The 25 in. x 3.85 in. 4-ply balloon tires, specially developed by Firestone, are fitted on 18-in. diameter rims. Timken bearings, interchangeable with those of the Henderson, are used in both wheels. External contracting and internal expanding brakes are fitted on the rear wheels, the latter being at extra cost.

Such items as the tank, saddle, mudguards, etc., are interchangeable with those of the Henderson model. The color scheme is in sage green, relieved by red and black striping.

The 1925 *Harley-Davidson* models were fully described in AUTOMOTIVE INDUSTRIES on Sept. 11, 1924, and no changes have been made since their introduction. Prices have been reduced $10 and $5 on the JDCA and JE models respectively. A feature of the exhibit was the mounting of several machines both solo and with side cars on high revolving stands, making it a simple matter to inspect the machines at eye level.

Lower Priced Henderson

Several improvements have been incorporated in the 1925 *Hendersons*, the most important being the adoption of 27 in. x 3.85 in. balloon tires in place of the regular high pressure 27 in. x 3½ in. tires. The brakes, which are of the automobile type, have been made heavier and the area of the braking surface slightly increased. The gear shifter fork, formerly made in two pieces and adjustable only when the transmission is disassembled, is now in one piece, with a convenient outside screw adjustment.

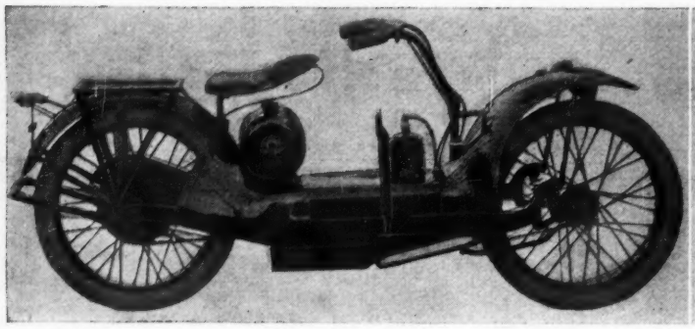
While no price reductions have been made on the 1925 machine, a new model is offered, having cast iron pistons instead of aluminum, which have been standard for a number of years. The new machine lists at $415, $20 less than the standard.

A number of inquiries have been received at the factory from tentative "light" airplane builders in consequence of the two winning machines in the light airplane contests at the International Air Races at Dayton

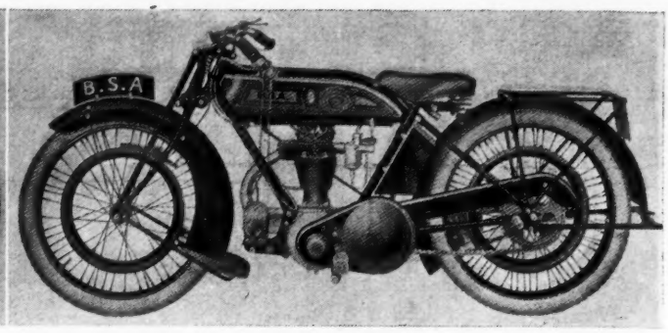
Motorcycle Prices Announced at Recent New York Show

Make	Model	Old	New
B. S. A.	2½ h.p.	†	$280
B. S. A.	3½ h.p.	†	390
Evans	Power Cycle	$140	120
Excelsior	"Super X"	†	285
Excelsior	"Super X"	†	250*
Harley-Davidson	J.D.C.A.	345	335
Harley-Davidson	JE	320	315
Henderson	Deluxe	435	435
Henderson	Deluxe	†	415
Indian	Prince	215	215
Indian	Prince	$185	$185*
Indian	Scout	275	275
Indian	Scout	240	240*
Indian	Chief	335	335
Cleveland	Two Cycle	185	165*
Cleveland	Two Cycle	215	195
Cleveland	Four Cycle	†	185*
Cleveland	Four Cycle	†	215
Nearacar	Single Brake	200	175
Nearacar	Double Brake	210	185
Nearacar	Delivery	†	350

† New model * Not electrically equipped



Neracar's 1925 model. Motor is increased 1 hp. Heavier springs are used on front forks. Brake is actuated by adjustable rods



The single-cylinder, overhead valve B. S. A. was the only foreign exhibit. A speed of 75 m.p.h. is claimed for this car. Note front-wheel brake

last October, being fitted with Henderson motorcycle engines. It is likely that the Henderson engine will be produced in quantities, fitted with a reduction gear and propeller hub, for installation in "light" airplanes. It is estimated that the cost of changing the factory equipment to manufacture these motors will amount to $20,000.

Indian Line Unchanged

No mechanical improvements or price changes have been made since the new *Indian* line was described in AUTOMOTIVE INDUSTRIES of Sept. 25. The layout of the Indian exhibit was very attractive, one specimen of each of the three models being entirely electro-plated and mounted on pedestals.

But for the adoption of a large single headlight instead of the two of the smaller type, the external appearance of the new *Neracar* models remains unchanged.

Increasing the stroke ⅛ in. and making certain modifications has added 1 hp. to the output of the motor. Riding qualities have been improved by using heavier coil springs on the front fork, and the brakes, which were formerly actuated by cables, are now coupled with adjustable rods. The gasoline tank and the bottom pan both have been strengthened. The former now is made in two sections with electrically welded joints instead of in three sections with soldered joints, while the latter is made of heavier gage stock and considerably reinforced.

An interesting three-wheeled machine, known as the light delivery Neracar, was shown for the first time. It lists at $350. The van, having a carrying capacity of 150 lb., is made of pressed steel and mounted between two wheels, the third or driving wheel being in the center behind. Wheelbase is 58 in., with 26-in. wheels. The entire vehicle is finished in Duco.

To provide more power for the heavier duty imposed in delivery work, the 1925 motor has been made still larger, giving 4½ hp. For an additional charge of $10 the delivery van motor can be fitted in the two wheelers for those who desire more power and greater speed. Prices on both the double and single brake Neracars have been reduced $25.

Foreign Model Is Shown

Two models, a 2½ hp. and 3½ hp., were exhibited by *B. S. A.*, this being the first and only foreign motorcycle exhibit at the show.

While the prices of $280 for the smaller model and $390 for the larger are considerably above those of the corresponding size of the domestic machines, it is understood that a number of dealers have signed up to take over the sale of the B. S. A. motorcycles in several sections of the country.

Except for a smaller L-head motor and other minor changes, the 2½-hp. model is similar to that of the 3½-hp. machine which is described herewith.

The bore and stroke of the 3½-hp. model is 72 x 85½ mm., giving a piston displacement of 349 cu. cms. The cylinder head carrying the overhead valves is detachable, the valves being operated by phosphor bronze bushed rockers equipped with felt oiling rings working on hardened steel pins. Aluminum alloy pistons are also employed.

Roller bearings are used in the big end of the connecting rod, with the engine main shaft mounted on ball bearings on the driving side and a plain bushing on the gear side.

Floating Dry Plate Clutch

The clutch is of the floating dry-plate type, controlled by a hand lever on the handle bars by means of flexible cable. Drive from the three-speed gearset to the rear wheels is by ⅝ in. x ¼ in. roller chains protected efficiently with a guard. The primary drive is by chain and totally inclosed, incorporating a cush drive fitted to the engine shaft, entirely eliminating transmission shocks.

The frame is designed to give an exceptionally low riding position and is built of seamless steel tubing with forged steel lugs strengthened and fitted with special connection for side-car use. Shocks are absorbed in the front fork by means of links connected to a taper compression spring.

A front-wheel brake, operated by a lever on the handle bars, is fitted, as well as another operating on the rear wheel and controlled by a toe pedal. In both types a composition shoe operates inside of a V-type of rim. In place of the customary boards, foot rests are provided which are adjustable to suit the rider; rubber knee grips are built integral with the tank to give the rider a better grip on the machine, which, it is said, is capable of doing better than 75 miles an hour.

Dunlop cords, size 26 in. x 2½ in., are fitted. Extra wide 3-in. tires are offered at extra cost. The frame is finished with four coats of black enamel and all fittings, including the muffler and tail pipe, heavily plated. The weight of this machine is 228 lb., as compared with that of the smaller model at 180 lb.

Natural Wear Tread

IN the extracts from B. J. Lemon's paper on balloon tires, printed in the Feb. 5 issue of AUTOMOTIVE INDUSTRIES, page 217, the markings Fig. 4 and Fig. 5 were interchanged. The cut marked Fig. 4, which should have been marked Fig. 5, shows the imprint of a "natural wear" tread tire, while the cut marked Fig. 5, which should have been marked Fig. 4, shows the imprint of a round tread tire.

Engineer Says Boss Bolts Are Superfluous on Small Diameter Wheels

Sufficient support given to brake drum on wheels for balloon tires by using spokes of slightly extra width, hub flanges of adequate size and twelve hub bolts. Explains causes of squeaks.

By A. S. Van Halteren

Chief Engineer, Wood Wheel Division, Motor Wheel Corp.

THE early automobile artillery wood wheels were built with hub flanges and brake drums of small diameters, the drums being supported by the hub bolts. As the drums increased in diameter the hub bolts on a small diameter bolt circle proved inadequate, which led to the use of spoke clips and bolts through the spokes outside of the hub flanges as a means of supporting the drum independent of the hub bolts. In some cases the spoke clips or boss bolts were used in combination with the hub bolts.

As the service demanded of the wheels increased, the hub design was strengthened by increasing the diameter of the hub flange and bolt circle. This increase in the bolt circle, combined with the tendency to use more bolts and heavier metal in the brake drums, improved the brake drum support to such an extent as to permit the elimination of the clip or boss bolt on some designs.

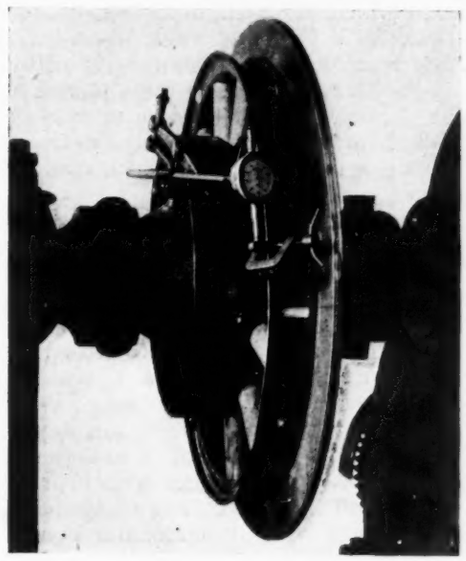
When the flat back drum was used, which was so mounted as to bear against the back of the spokes outside the hub flange, boss bolts were continued, their use being considered preferable, as a means of preventing noise, to supporting the drum or strengthening the wheel. Two distinct noises experienced have both been corrected with boss bolts—a squeak and a squeal. The squeak is caused by a torsional deflection of the spoke rubbing against the flat back of the brake drum when the car is started either forward or backward, when the brake bands are applied. This squeak can be eliminated with boss bolts, or by providing clearance between the spokes and the drum, or by making the spoke and hub construction sufficiently rigid to avoid torsional deflection of the spoke. The last method is difficult of accomplishment with the long spokes necessary for high pressure tires. But with smaller diameters used for balloon tires, and with the heavy, wide spoke barrel, the tendency toward torsional deflection has been very much reduced. In most cases where the boss bolts have been eliminated the number of hub bolts has been increased to twelve, which has given the wheel additional rigidity against torsion.

Cause of Squealing Brakes

The second noise, the squeal, is produced on many cars when the brakes are applied. This is caused by vibration of the drum, which is reduced somewhat by using six boss bolts, but it has been found necessary in some cases at least to use twelve boss bolts, placed close to the outside diameter of the drum in order to eliminate this noise entirely.

This gives ground for the opinion that six boss bolts cannot be justified in a balloon tire wheel using our special heavy spoke, except possibly to hold the drum true or to strengthen the wheel. But the drum undoubtedly has a better chance to maintain its trueness if it is not bolted to the spokes, which are flexed considerably by the side thrust from ordinary service. In other words, the brake drum is more likely to remain true if clearance is provided between the drum and the spokes above the hub flange proper.

The boss spoke is weakened by the bolt hole, so that



Wheel torsion test fixture

it invariably breaks over the edge of the drum and through the bolt holes when the wheel fails from side thrust. This shows that the weakening effect due to the hole drilled through the center of the boss spoke is not entirely compensated for by the strengthening due to the bulge of the spoke, the so-called boss.

The boss bolt serves to reinforce the wheel against torsion, but a wood wheel seldom fails in torsion. A torsional test on a 30 x 3½-in. wheel with light spokes, 6½-in. hub flange and eight ⅜-in. hub bolts, but no boss bolts, shows the wheel to be elastic up to a torsional strain of 30,000 in.-lb. Assuming a 1000 lb. radial load on a wheel and a coefficient of friction of 0.6 between wheel and ground, when the wheels are locked by the brakes we obtain a tangential load of

$$0.6 \times 1000 = 600 \text{ lb.},$$

which indicates a factor of safety of

$$30{,}000 / (15 \times 600) = 3.3,$$

for a light wheel of comparatively large diameter, and that based on the elastic limit. Tests also show that these wheels without boss bolts are amply strong.

Many Variations Possible in Design of Evaporative Cooling Systems

Cylinder jackets remain filled with water in all cases, while temperature need not exceed that attained in conventional systems. Water loss almost nil.

By N. S. Diamant*

ALTHOUGH conventional systems of cooling have some very decided disadvantages, comparatively little time and talent are being devoted to systematic research in the field of cooling problems. The steam system appears to present a very good simple remedy and other systems can be developed which offer technically sound and commercially practical solutions.

Steam or evaporative systems of cooling involve means of cooling in which the parts of the engine to be cooled are waterjacketed in the usual way. Water in the jackets is allowed to reach its boiling point, after which the heat rejected to the jackets vaporizes the liquid at a temperature which depends on the pressure exerted on its free surface. Vapor or steam given off at the free surface is led into a condenser or radiator, which condenses it and returns it to the jackets.

Most steam systems operate at about 212 deg. Fahr. or at an atmospheric pressure of 14.7 lb. per sq. in. If desired, a steam-cooling system can be operated at more than atmospheric pressure and at a correspondingly higher temperature, although there seems to be little necessity or desire at the present time to use temperatures above 212 deg. For those who wish to adopt lower temperatures, such as 170 to 190 deg. Fahr., ordinary alcohol-water solutions afford a very simple and reliable means. There should be no objection to the use of alcohol in both winter and summer, since with a properly operating steam system there is no loss of alcohol by vaporization as is the case with conventional systems.

Fig. 1 shows a system in which the water jackets merge into the steam chest *a*. This chest is partially filled with water to a level determined by the location of the filler *b*. When the engine first is started, the parts of the system above the water level are full of air, since the vent *d* at the top of the radiator *e* is open to the air, and the system operates at atmospheric pressure.

After the heat rejected to the jackets begins to vaporize the water in the engine block, steam is given off at the free surface of the water in the steam chest and this steam will force the air out of the radiator gradually, be condensed and returned to the system as indicated by the arrows. The warming-up period can be shortened by decreasing the quantity of water in the jackets.

Two Forms of Radiator

The arrangement shown in Fig. 2 is like that in Fig. 1 except that the external part of the jacket circuit connecting its upper and lower portions have been eliminated, and thus no water circulation is provided other than the local circulation within the jackets due to natural convection and the ebullitional of boiling.

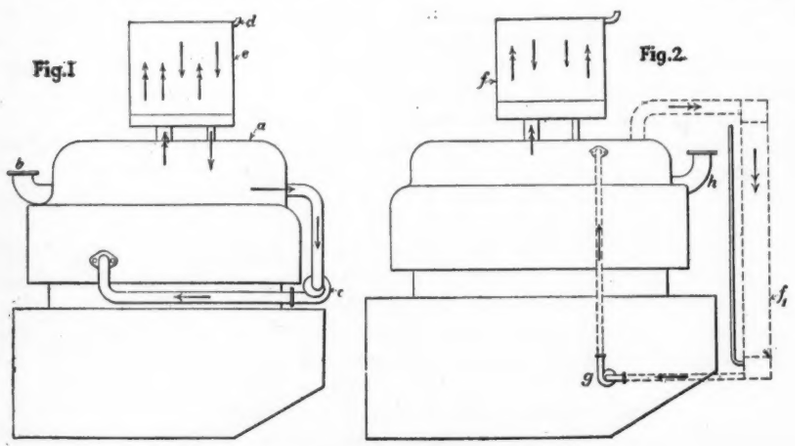
Two alternative forms of radiator are shown. In one, the radiator *f* is above the engine as in Fig. 1; in the other, indicated by dotted lines, the radiator f_1 is in front of the engine and a pump *g* lifts the condensate from the bottom of the radiator to the steam chest.

In Fig. 3 the location of the radiator with relation to the engine is again such that it becomes necessary to use a pump, *j*, to lift the condensate from the bottom of the radiator to the jackets. In this case the condensate is fed to the jackets at a point below the water level and a check valve *k* or some equivalent means is added to prevent the water in the jackets from flowing back into the radiator core *l*.

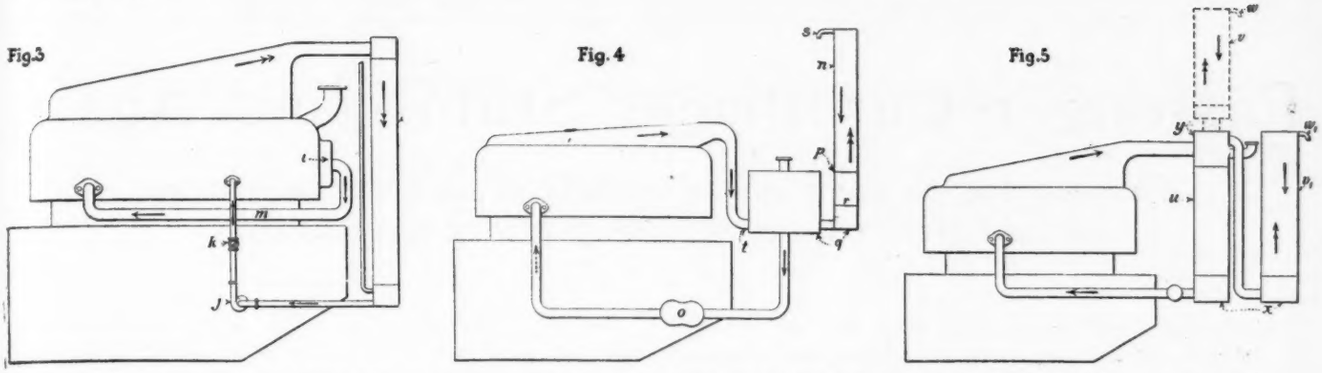
It is immaterial what mechanical or other means is adopted to lift the condensate from the radiator bottom-tank to the jackets so long as it is dependable and drains the tank well enough under all conditions so as not to form a water seal to the vent and interfere with its action. The suction of the manifold can be used, if desired, or a venturi tube can be inserted in the pipe line *m* (Fig. 3) and the suction at the throat of the venturi made to lift the water.

A form of system shown in Fig. 4 is considerably different from the preceding ones. In this the steam chest is below the jackets, which arrangement gives it novelty but necessitates making provision to maintain the free surface from which steam is given off, at a level below the radiator core *n*. This has been

*Condensed from a paper presented at the recent annual meeting of the Society of Automotive Engineers. The author is consulting engineer, National Radiator & Mfg. Co., Detroit.



Figs. 1 and 2—Diagrams of two forms of evaporative cooling system with steam chest on top of cylinder



Figs. 3, 4 and 5—Other forms of evaporative cooling systems with condenser in various positions relative to engine

accomplished in practice by means of a positive gear pump *o*. When the pump is not running, the water stands at the level *p*, filling the reservoir *q* and also part of the radiator.

With the conventional relative position of radiator and engine, the upper parts of the water jacket and cylinder head are left dry. As soon as the gear pump is started, it should pump water from the reservoir into the jackets and, after filling these, it should maintain a circulation in the jackets and should also maintain the water level at *r* just below the bottom of the radiator core, at all speeds. When the water in the radiator bottom tank begins to give off steam, the steam rises into the condenser, is condensed and then returned to the system.

Size of Radiator Important

Fig. 5 shows a disposition of elements in some steam-cooling systems* in which a radiator *u* is included in series with the jackets. It is clear that if this radiator be large enough the system will operate as an ordinary pump or thermosyphon system, as the case may be, but, if the radiator is made sufficiently small or proves sufficiently small at any time the circulating water will begin to boil and give off steam. Two alternative condenser arrangements are shown. When the condenser *v* is disposed as shown in dotted lines, the steam rises, forces the air in the condenser out through the vent *w* and is condensed and returns to the jackets by gravity. In the second arrangement, shown in solid lines, the steam must build up sufficient pressure to be forced down the pipe into the condenser v_1 against its natural tendency to rise. It is then condensed and drops down, the water filling the tank *x* at the bottom of the condenser.

This process will continue as long as the engine is running and it may be maintained until the whole condenser is filled with water. When this occurs, it is, of course, conceivable that the cylinder head may be left without water. If the engine is stopped, however, or, in general, whenever so little heat is rejected to the jacket that steam ceases to be generated and the radiator cools down enough to condense the steam in the steam chest and the pipe leading to the condenser, the vacuum produced in the steam chest will suck the condensate back into the radiator *u* from the condenser v_1.

What actually occurs in steam cooling systems is that heat is transferred to the water in the jackets from the combustion chamber and the temperature of the water continues to rise until bubbles of steam are formed at the hot walls of the jackets. The bubbles tend to rise to the free surface of the water in the steam chest. Hence the water is much agitated and all the heat passing into the jackets expends its energy in forming these bubbles and not in increasing the temperature of the water, which temperature is determined by the pressure above the free surface.

When a car is stopped quickly and the engine also is stopped, so that the condensing effect of the radiator is reduced practically to nil, the generation of steam in the steam chest continues from one to three minutes. until the temperature of the inside jacket-walls and that of the water in the jackets is equalized. This also occurs, of course, with present conventional systems, but it does not make itself apparent unless the water is at the boiling point.

With steam cooling systems that are properly designed and cooled, I have observed that, under ordinary conditions, no after steaming effect is noticeable when the car and engine are stopped quickly, but after a long steady and heavy pull uphill or after a long steady run at high speed, when the car and engine are stopped, steam may, and usually will, escape from the vent for a minute or two. If the engine is idled or the car is run for a short distance at moderate speed after a heavy pull, no escape of steam is noticeable.

Most of the systems I have described will work when applied to present-day cars, trucks or tractors if they are intelligently designed and intelligently incorporated in the vehicles. The engine will perform apparently as well on the road when steam cooled as it did when water cooled.

As to whether this proves that steam cooling is practical I do not care to commit myself, but it looks hopeful, and I believe that those who undertake some real research along these lines will be more than compensated even for the experimental outlay, besides receiving other tangible and intangible benefits.

*This system, as shown in solid lines, was described in AUTOMOTIVE INDUSTRIES, Sept. 20, 1923, page 581.

SINGLE-BLOW and slow-bending notched bar tests of several metals and alloys rolled into flat plates and tested by the Bureau of Standards in its investigation of methods of notched bar testing showed marked differences in results on specimens with the notch cut on the top and on the side of the plate, respectively. To explain the results, an extended metallographic study has been made of the specimens.

Many engineers question the real usefulness of impact testing because of alleged erratic results and the obscurity of the relation between test values and service. This work should be of value in showing a cause for results which appear erratic, if superficially considered, but which, when correlated with the metallographic constitution of the material, are not only not erratic but throw valuable light on the usefulness of the material.

Passenger Car Prices Stabilizing Again

Changes due to multitude of individual competitive reasons. General Motors Corp. holds to policy of no reductions.

THE price flurry seems to be over. We say this advisedly, because you never can tell. But it seems pretty certain at present that "it ain't gonna rain no mo'."

This impression is confirmed by the utter lack of price changes during the Chicago show. Following some fifteen or twenty revisions in the New York exhibition, the quiet which prevailed throughout the Western exhibit warrants the conclusion that price stability has been established again.

Now that it's all over, what are the results? To begin with, the movement toward definitely lower priced closed cars, started by the Hudson cut about Nov. 1, has swept through a good part of the industry. Closed cars are available in every price group at a lower level than they were four months ago. The chief reductions, of course, have been in coaches in the case of those companies like Hudson, Essex, Studebaker, Moon and others which build models of this type. But cuts in sedans by such companies as Packard, Hudson and Dodge were features of the movement.

Some makers, however, held up prices of their regular sedans, dropping them only slightly, and in one or two instances increasing them, apparently to widen the spread between the increasingly popular coaches and the standard closed-car types.

Why Were Changes Made?

A general interpretation of the price changes, however, is difficult because the revisions were due to a variety of individual causes rather than to any basic reason affecting all makers alike.

The downward revision of prices which took place back in 1921, for instance, was due to the necessity for the automotive industry to readjust itself to the general deflation which was taking place in all industry. Every manufacturer was in the same boat. Everybody had to cut in accordance with the dictates of a fundamental economic trend.

But the revisions of recent months were caused by no such basic influence. Traced down to the final analysis, a different reason for the changes might be discovered in nearly every case. One company may have cut to get in on the ground floor on coach sales. Another may have dropped its coach prices to meet the competition of the first cut. Still another may have cut sedan lists to clear the dealer stocks of such models in preparation for the announcement of a coach for the first time. Others may have cut standard closed models to enlarge their closed-car market and thus bring their percentage of closed-car production in line with that of the trend of the industry as a whole.

Any number of special reasons exist for the cuts which have been made, the influences bearing on the changes varying not only with the make of car but with the particular model affected. Touring car prices were lowered in some cases, probably in an attempt to clear stocks of such models; they were raised in others in an attempt to increase closed-car sales.

No basic economic reason for price cutting existed. Material prices seem to be going up rather than down; selling costs are rising; production costs aren't being cut sufficiently to affect the list price to any marked extent. Several companies, in fact, such as Oldsmobile, Chevrolet and Apperson, have raised their prices slightly.

Big Company Holds Firm

Throughout the entire price flurry, which covered a period of about three months, General Motors Corporation held firm the prices of its vehicles, except in the case of the two increases mentioned. Despite reductions by strong competitors in certain price groups, the big organization followed through without a hitch the policy announced by its president, A. P. Sloane, just before the middle of November. Mr. Sloane at that time, it will be remembered, said:

"I cannot see any justification for price reductions. Certainly material will not be any lower—if anything, higher. I believe that manufacturers who reduce prices in the hope of getting business from competitors will be disappointed. General Motors is not going to take that position."

Probably the policy which has been maintained by General Motors has been one factor in stabilizing the price situation within a relatively short period.

Whether or not the price cuts result in a material shifting of business from one company to another remains to be seen. The sales records of the next six months will tell the story, although it must be remembered that selling efficiency and character of dealer organization often are stronger factors in determining the total number of sales than is a small difference in list price.

With the new price levels established, the automotive industry is giving the public greater value for its money than any other important industry in the country. This is a remarkable achievement in view of the fact that before the recent cuts it already was providing $1.11 worth of value for every dollar taken in, the 1913 dollar assumed as a base.

Dealer Attitude Varies

Some dealers question the advisability of the cuts, since in certain cases they are being expected to make up in volume of sales what they lose in discount, the latter having been decreased along with the list. Here, again, advance predictions are hard to make.

The tendency to seek profits through increased volume has been very strong in the past, and it has not always been successful despite two or three outstanding experiences to the contrary. With sales resistance growing and the rate of growth of the industry automatically slowing up and coming to stabilization, profits through volume alone are going to be harder and harder to get. Certainly a lower price increases the number of possible buyers for the given car, but too much reliance cannot be placed on that single factor. Nevertheless, very encouraging increases in sales are being reported by at least two companies which cut prices in expectation of increasing profits through greater volume.

Passenger Car Price Changes Since November 1, 1924

MAKE AND MODEL	Date	Body Style	Prices Old	Prices New	Difference
Chevrolet	Jan. 15, 1925	Roadster	$495	$525	+$30
Chevrolet	Jan. 15, 1925	Touring	510	525	+15
Chevrolet	Jan. 15, 1925	Coupe	640	715	+75
Chevrolet	Jan. 15, 1925	Coach	695	735	+40
Chevrolet	Jan. 15, 1925	Sedan	795	825	+30
Ford	Dec. 11, 1924	Runabout	265	260	−5
Ford	Dec. 11, 1924	Touring	295	290	−5
Ford	Dec. 11, 1924	Runabout	350	345	−5
Ford	Dec. 11, 1924	Touring	380	375	−5
Ford	Dec. 11, 1924	Coupe	525	520	−5
Ford	Dec. 11, 1924	Sedan Fordor	685	660	−25
Ford	Dec. 11, 1924	Sedan Tudor	590	580	−10
Dodge	Dec. 11, 1924	Roadster	865	855	−10
Dodge	Dec. 11, 1924	Sport Roadster	955	955	−10
Dodge	Dec. 11, 1924	Touring	895	885	−10
Dodge	Dec. 11, 1924	Sport Touring	995	985	−10
Dodge	Dec. 11, 1924	Coupe "B"	1035	995	−40
Dodge	Dec. 11, 1924	Spec. Coupe "B"	1135	1095	−40
Dodge	Dec. 11, 1924	Sedan "B"	1250	1095	−155
Dodge	Dec. 11, 1924	Spec. Sedan "B"	1350	1195	−155
Dodge	Dec. 11, 1924	Sedan "A"	1385	1245	−140
Dodge	Dec. 11, 1924	Spec. Sedan "A"	1485	1330	−155
Durant	Dec. 11, 1924	Touring	890	830	−60
Durant	Dec. 11, 1924	2-p Coupe	1035	935	−100
Durant	Dec. 11, 1924	4-p Coupe	1240	1160	−80
Durant	Dec. 11, 1924	Sedan	1365	1190	−175
Durant	Dec. 11, 1924	Coach	1185	1050	−135
Essex	Nov. 6, 1924	Coach	1000	945	−55
Essex	Dec. 4, 1924	Coach	945	895	−50
Gray	Jan. 22, 1925	5-p Sedan	995	975	−20
Maxwell 25	Nov. 20, 1925	Sedan	1325	1345	+20
Maxwell 25	Jan. 15, 1925	Club Coupe	1025	995	−30
Maxwell 25	Jan. 15, 1925	Club Sedan	1095	1045	−50
Maxwell 25	Jan. 15, 1925	Sedan	1345	1095	−250
Oldsmobile	Jan. 22, 1925	Roadster	875	890	+15
Oldsmobile	Jan. 22, 1925	Touring	875	890	+15
Oldsmobile	Jan. 22, 1925	Coach	1065	1075	+10
Oldsmobile	Jan. 22, 1925	Sedan	1250	1285	+35
Oldsmobile	Jan. 22, 1925	Sedan	1350	1375	+25
Overland 91	Jan. 15, 1925	Roadster	530	495	−45
Overland 91	Jan. 15, 1925	Touring	530	495	−45
Overland 91	Jan. 15, 1925	Coupe	695	635	−60
Overland 91	Jan. 15, 1925	Sedan	850	715	−135
Apperson 6	Jan. 8, 1925	Sp. Phaeton	1695	1850	+155
Apperson 6	Jan. 8, 1925	Coupe	1985	2350	+365
Apperson 6	Jan. 8, 1925	Sp. Sedan	2295	2395	+100
Apperson 6	Jan. 22, 1925	Sp. Phaeton	1850	1695	−155
Apperson 6	Jan. 22, 1925	Coupe	2350	1985	−365
Apperson 6	Jan. 22, 1925	Sp. Sedan	2395	2295	−100
Auburn 6-43	Jan. 15, 1925	5-p Sedan	1795	1595	−200
Chrysler 6	Nov. 20, 1924	Brougham	1895	1965	+70
Davis 90	Nov. 27, 1924	Sedan	1895	1995	+100
Davis 91	Nov. 27, 1924	Sedan	2195	2295	+100
Flint 40	Nov. 20, 1924	Brougham	1630	1640	+10
Hudson 6	Nov. 6, 1924	Coach	1500	1395	−105
Hudson 6	Dec. 4, 1924	Coach	1395	1345	−50
Hudson 6	Dec. 4, 1924	5-p Sedan	2150	1795	−355
Hudson 6	Dec. 4, 1924	7-p Sedan	2250	1895	−365
Hupmobile R	Dec. 18, 1924	Coupe	1450	1350	−100
Hupmobile R	Dec. 18, 1924	Club Sedan	1475	1375	−100
Jewett	Feb. 15, 1925	Touring	1175	1205	+30
Jewett	Feb. 15, 1925	Coupe	1310	1340	+30
Jewett	Feb. 15, 1925	Brougham	1385	1415	+30
Jewett	Feb. 15, 1925	Sedan	1545	1580	+35
Jewett	Feb. 15, 1925	De Luxe	1290	1320	+30
Jewett	Feb. 15, 1925	De Luxe	1525	1555	+30
Jewett	Feb. 15, 1925	De Luxe	1745	1780	+35
Jordan A	Jan. 22, 1925	7-p Sedan	3250	3225	−25
Kissel 55	Jan. 15, 1925	7-p Sedan	$3395	$3285	−$110
Kissel 55	Jan. 15, 1925	7-p Berline	3495	3385	−110
Moon Series A	Jan. 22, 1925	Sedan 2-Door	1495	1595	+100
Moon Series A	Nov. 6, 1924	Roadster	1450	1295	−155
Moon Series A	Nov. 6, 1924	Sp. Touring	1395	1195	−200
Moon Series A	Nov. 6, 1924	Sedan 2-Door	1695	1495	−200
Moon Series A	Nov. 6, 1924	Sedan 4-Door	1795	1695	−100
Moon Newport	Nov. 6, 1924	Touring	1595	1495	−100
Moon Newport	Nov. 6, 1924	Sedan	2045	1815	−230
Moon Newport	Nov. 6, 1924	Petite Sedan	2345	1915	−430
Moon Metropolitan	Nov. 6, 1924	Touring	1695	1515	−180
Moon Metropolitan	Nov. 6, 1924	Sedan	2135	1995	−140
Moon Metropolitan	Nov. 6, 1924	Sp. Sedan	2245	2095	−150
Moon London	Nov. 6, 1924	Sp. Touring	2095	1985	−110
Moon London	Nov. 6, 1924	Petite Sedan	2800	2540	−260
Rickenbacker C	Jan. 15, 1925	Sp. Roadster	1645	1595	−50
Studebaker Std. 6	Jan. 15, 1925	Country Club	1395	1345	−50
Studebaker Std. 6	Jan. 15, 1925	Coupe	1495	1445	−50
Studebaker Std. 6	Jan. 15, 1925	Sedan	1595	1545	−50
Studebaker Std. 6	Jan. 15, 1925	Berline	1650	1600	−50
Studebaker Spec. 6	Jan. 15, 1925	Victoria	2050	1895	−155
Studebaker Spec. 6	Jan. 15, 1925	Sedan	2150	1985	−165
Studebaker Spec. 6	Jan. 15, 1925	Berline	2225	2110	−115
Studebaker Spec. 6	Jan. 29, 1925	Berline	2225	2060	−165
Studebaker Big 6	Jan. 15, 1925	Coupe	2650	2450	−200
Studebaker Big 6	Jan. 15, 1925	7-p Sedan	2785	2575	−210
Studebaker Big 6	Jan. 15, 1925	7-p Berline	2860	2650	−210
Willys-Knight	Jan. 8, 1925	Coupe	1770	1495	−275
Willys-Knight	Jan. 8, 1925	Sedan	1795	1575	−120
Willys-Knight	Jan. 8, 1925	Coupe Sedan	1550	1495	−55
Willys-Knight	Jan. 8, 1925	Sedan De Luxe	1995	1695	−300
Willys-Knight	Jan. 22, 1925	Roadster	1275	1295	+20
Willys-Knight	Jan. 22, 1925	4-p Coupe	2395	2345	−50
Cadillac V-63	Dec. 4, 1924	Roadster	3085	3185	+100
Cadillac V-63	Dec. 4, 1924	Touring	3085	3185	+100
Cadillac V-63	Dec. 4, 1924	Phaeton	3085	3185	+100
Packard 6	Jan. 1, 1925	4-p Coupe	3275	2585	−690
Packard 6	Jan. 1, 1925	5-p Coupe	3450	2685	−765
Packard 6	Jan. 1, 1925	Sedan	3375	2585	−790
Packard 6	Jan. 1, 1925	5-p Limousine	3425	2785	−640
Packard 6	Jan. 1, 1925	7-p Sedan	3625	2785	−840
Packard 6	Jan. 1, 1925	7-p Limousine	3675	2885	−790
Paige 6-70	Jan. 8, 1925	Sedan	2770	2840	+70
Paige 6-70	Jan. 8, 1925	Limousine	2895	2965	+70
Paige 6-70	Jan. 15, 1925	7-p Phaeton	2165	2195	+30
Peerless 6-70	Dec. 4, 1924	Roadster	2335	2350	+15
Peerless 6-70	Jan. 15, 1925	Coupe	1950	2495	+455
Peerless 6-70	Jan. 15, 1925	5-p Sedan	2995	2565	−430
Peerless 6-70	Jan. 15, 1925	7-p Sedan	3295	2765	−530
Stanley 252	Dec. 18, 1924	Phaeton	2750	2500	−250
Stanley 252	Dec. 18, 1924	Sedan	3585	3300	−285
Wills Ste. Claire	Jan. 18, 1925	Roadster	2875	2985	+110
Wills Ste. Claire	Jan. 18, 1925	Traveler	2975	3085	+110
Wills Ste. Claire	Jan. 18, 1925	Phaeton	2875	2985	+110
Wills Ste. Claire	Jan. 18, 1925	Coupe	3675	3785	+110
Wills Ste. Claire	Jan. 18, 1925	5-p Sedan	3775	3885	+110
Wills Ste. Claire	Jan. 18, 1925	7-p Sedan	3800	3900	+100
Wills Ste. Claire	Jan. 18, 1925	Brougham	3800	3900	+100
Wills Ste. Claire	Jan. 18, 1925	Limousine	3990	4085	+95
Dorris	Dec. 18, 1924	7-p Touring	3950	4150	+200
Marmon 74	Nov. 13, 1924	Roadster	3295	3165	−130
Marmon 74	Nov. 13, 1924	Touring	3295	3165	−130
Marmon 74	Nov. 13, 1924	Coupe	3585	3455	−130
Marmon 74	Nov. 13, 1924	Sedan	3985	3775	−210
Marmon 74	Nov. 13, 1924	Sedan	3985	3850	−130
Marmon 74	Nov. 13, 1924	Limousine	4285	3900	−385
Marmon 74	Nov. 13, 1924	Limousine	4285	3975	−310
Revere	Dec. 18, 1924	Roadster	3200	2750	−450
Revere	Dec. 18, 1924	Speedster	3200	2750	−450
Revere	Dec. 18, 1924	Touring	3200	2750	−450
Revere	Dec. 18, 1924	Sedan	4000	3800	−200

Novel Machine Tests Engines at Morris Plant in England

Routine test divided into several phases which are indicated by colored lights. New ideas embodied in making of parts. Steel flywheels machined on continuous plan.

METHODS designed to combine quantity production with accuracy of performance are used in testing, as well as in machining, engines at the plant of Morris Engines, Ltd., Coventry, England. Labor saving devices are being applied to the tests given the completed engine, just as they are to the manufacture of the power-plant which was described in AUTOMOTIVE INDUSTRIES of Feb. 12. The system used is described by Frank G. Woolard in a paper read recently before the Institute of Automobile Engineers.

For testing, the engine is lifted by overhead crane; the empty truck is run from the front of the bed to the rear, where it awaits the tested engine. The engine is placed on the test machine, and the services, namely, the holding-down clamps, the coupling to the dynamotor, the exhaust, inlet and outlet water, the gas and gasoline carbureter and the magneto, are coupled up in five minutes. The test machine, Fig. 1, has very many novel features; it permits the engine to pass through several phases, giving illuminated signals to enable the testing staff to know which stage the test has reached, and also giving revolutions and direct horsepower readings.

The first stage is to motor the engine at 350 r.p.m., a red light glowing to indicate that current is being taken from the power line. When the engine is free, with the motor running at about 750 r.p.m., a white light gives a clearance signal, when, by simple press-button control, the dynamotor drives the engine from 750 r.p.m. up to a free 1250 r.p.m. The horsepower taken by the dynamotor is registered on the negative side of the scale. If two push-buttons are pushed, or the wrong button, the machine stops. When the free stage is reached at 1250 r.p.m., the white light again glows.

The engine then drives the electric machine, town gas being the fuel. When the dynamotor delivers power back to the motor generator, which converts the town's alternating current to direct current for testing, a green light glows, and it is the test foreman's objective to balance green against red lights and so to run his test bed economically. The white light glows again when a predetermined horsepower has been reached.

How Engines Are Tested

The fuel is then changed from gas to gasoline and the engine is allowed to run in for a period, after which a dummy load is applied by means of a rheostat and resistance frame; an orange light glows while this is in operation. This is the actual testing period, and, after "vetting" the engine, the tester sets valves, etc., and leaves the engine until it pulls a definite predetermined load, which can be raised when alterations to the power-unit efficiency (such as the addition of aluminum pistons) call for it. When maximum power is obtained a blue light glows and the engine is released. Finished engines are lifted and transferred to the trolley at the rear of the bed, whence they are taken to the paint track. The trolley remains with the engine until it is fitted to the chassis at the assembly plant.

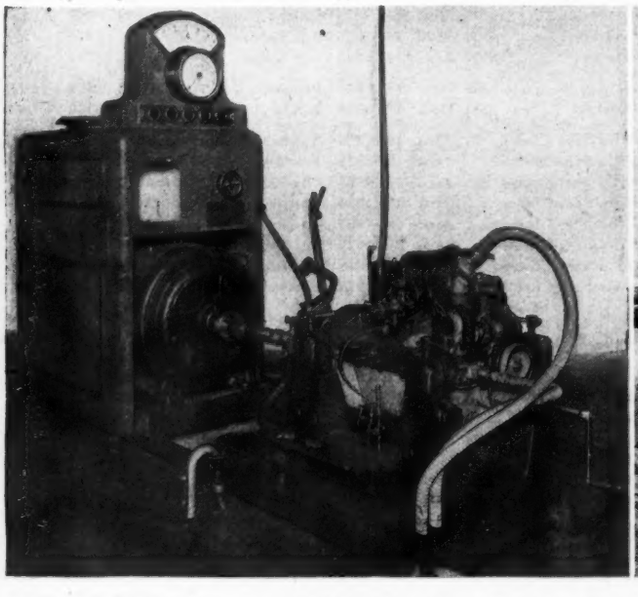


Fig. 1—Engine tests. Five colored lights above dynamotor indicate when various stages of the test have been completed

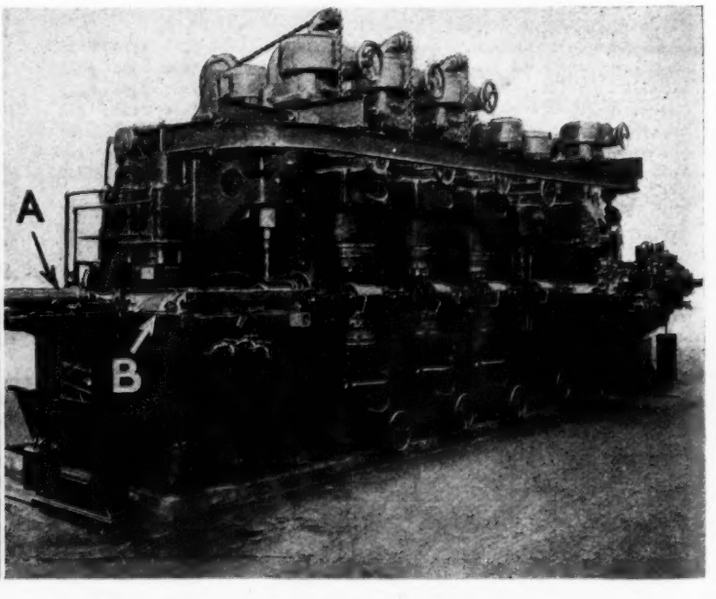


Fig. 2—Automatic flywheel finishing machine in which the workpiece and the jig travel together through all operations

Fig. 3—Section of flywheel machine showing workpiece (a steel forging) with milling cutters above and below

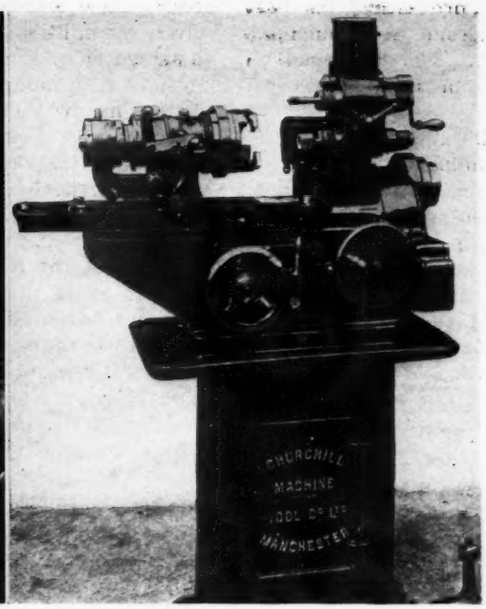


Fig. 4—Duplex slide grinding machine for grinding bore and face of small units in one setting

Should an engine be rejected from test, it is wheeled to the repair track, which is in front of the test bed, and, before it can be released for delivery, it has to pass through the test bed once again. After painting, the power unit goes into the storage bay, first of all passing onto a loop of track where the final inspection takes place. At the end of this loop an electric hoist lifts the engine in a cage, whence it is run onto a stacking or tiering truck by which any of the 21 engine racks can be selected. These are three tiers high and each tier holds seven engines—441 in all. The trolleys gravitate to the loading deck, but are stopped by an automatic catch which releases only one unit at a time. This catch is operated from a second stacker at the outward end, which lowers the block to the deck so that it may be picked up by air hoist and transferred to one of the waiting trucks; these usually carry two tiers of power units.

Making the Gearbox

The returning trucks discharge the empty trolleys onto the loading deck, whence they are rolled to a chain elevator, which automatically lifts and discharges them onto an elongated "helical" storage track of similar angle iron construction to the racks and test bed track. The trolleys gravitate to the floor level, where a stop holds them against release as required by the depletion of the test bed track due to dispatch of finished units.

The passage of the finished gearbox to the place where it is attached to the engine will be by power-cum-gravity overhead conveyor. This also forms a storage for finished boxes. The gearbox unit incidentally passes on this conveyor through a silence room, and if not up to standard is rejected and returns to the assemblers. Broadly speaking, the gearbox unit follows the procedure of the engine unit. A continuous operating machine will later be used for the production of the gearbox complete with studs ready for assembly. This machine is still under construction. It differs from the cylinder-block machine in the fact that the movement of the work-piece to each head is automatic, which is achieved by a series of jigs arranged on rails moved and indexed to position by compressed air.

A third continuous-operating machine probably will be of interest. This is for the production of flywheels, complete with clutch pins in position. The flywheel is a steel forging weighing in the rough 57 lb. and finished 43 lb.

The author would like to diverge a moment here to point out that, in large scale production, it frequently is more economical to put in the very best work and material rather than run the risk of delays due to irregularity. It was this policy that determined the use of the steel flywheel instead of cast iron, and this, with other examples, should help to stamp out the fallacy that large scale production necessarily means poor material or indifferent workmanship.

The flywheel machine is also unlike the cylinder-block machine because the movement of the workpiece in its jig is automatic and because the jig travels with the workpiece, whereas in the case of the cylinder block the workpiece goes "bare." This machine has relatively few operations, and, therefore, a brief description can be given to help out the illustrations, Figs. 2 and 3. The machine is of column formation, carrying operating heads that are controlled by cam motion from a central motor. The motor operating the cut is coupled direct with the head. Compressed air is largely used in the operation both of the heads and the work slides. The power, bus bars, air line, chip conveyor, cutting oil and lighting services are all contained in the machine column. All the heads are mechanically interlocked to stop the machine as a whole if any part fails to function. Press-button control is provided at reasonable distances, so that the operators can stop the machine in case of emergency. The jigs, which are carried on the knee of the machine, are steel castings of frame formation, and are carried on long V slides. They are arranged for the tools to operate simultaneously on both sides of the wheel. There is a train of seven jigs, one of which is an extra, i.e., it is unloaded and transferred while actual work is being performed in the remaining six.

Finishing Flywheels

The flywheel forging is delivered to the end of the machine at the point marked *A* in Fig. 2, and is loaded into the extra jig marked *B*. The jig, after loading, is brought by a pneumatic appliance in toward the column, under the clamping fixture and onto the jig track; the jig that was in the clamping fixture will have moved a stage forward. Under the clamping head, wedges are driven home at three points pneumatically. The jig is then traversed by means of the compressed air cylinder at the end of the machine and locked at each station by means of the cylinders shown on the front of the machine heads. The workpiece passes for its first movement under a simple drill head which roughs the center hole. Then the jig moves to the first roughing head, the chief duty of which is to break the scale on the inside form of the wheels, cutters being employed both from above downward and from below upward. The cutting action on these heads is opposed so that no great strain is imposed on the clamping mechanism.

For the next operation the jig travels to similar heads

fitted with tools for more advanced processing; the first pair of heads half finishes and the second pair completes the turning of the internal contours. The last head on the track drills the clutch-pin holes from below and reams and clamps them from above.

The jigs are then carried to an idle station, where the wedges are hammered loose, the jig pulled forward off the track and jacked up, all by compressed air mechanism. The elevating brings the wheel into contact with a magnet fixed on a swinging arm when the jig is lowered to the bed, leaving the wheel suspended to the magnet. The jig is then grabbed by the lifting tackle on the monorail, and returned by gravity to the loading station. The magnet delivers the wheel to the final operation on this side of the machine, and releases it, when the arm is swung into the correct position, by an automatic switch which acts at both of the extreme positions of the travel of the arm.

Final Operations

The flywheel is then placed on a dogged driving plate, and the clutch-pins, six in number, are pushed through the reamed holes into the driving plate, this action being performed by hand. This assembly is tracked under two more heads, the top one being a revolving anvil and the bottom a combination of ram and driving mechanism; the pins, which are of two diameters, are driven home by a vertical movement of the bottom head, and the wheel is clamped and revolved between the top and the bottom head.

Tools, which are carried in horizontal slides, are cam fed to position, traversing the faces of the rim and forming the periphery concurrently. This operation roughs and finishes the wheel, with the exception of certain highly finished surfaces, to accurate dimensions requiring further operations, which are performed on the back of the machine by simple vertical machine heads.

There is some vacant space at the back of the machine, which will probably be used for cleansing the wheel of oil and chips, also for balancing and inspecting it, thus delivering a completely finished "sub-assembled" component, which can be added to the engine without the use of further tools.

It may be useful now to glance at two or three machines for handling small components which, solely because of the quantities, became very troublesome and for which standard machines were unobtainable. One of these was the grinding of the gear-box splined main shaft. It was essential to grind the shafts, because highly accurate milling was negatived by subsequent case-hardening, and, in consequence, considerable hand work, involving

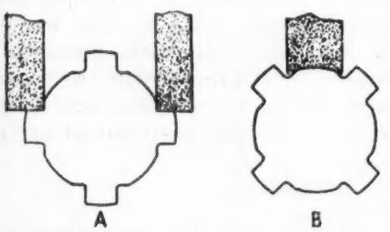


Fig. 5—Showing method of finish grinding splined shafts after hardening in two operations with plain wheels

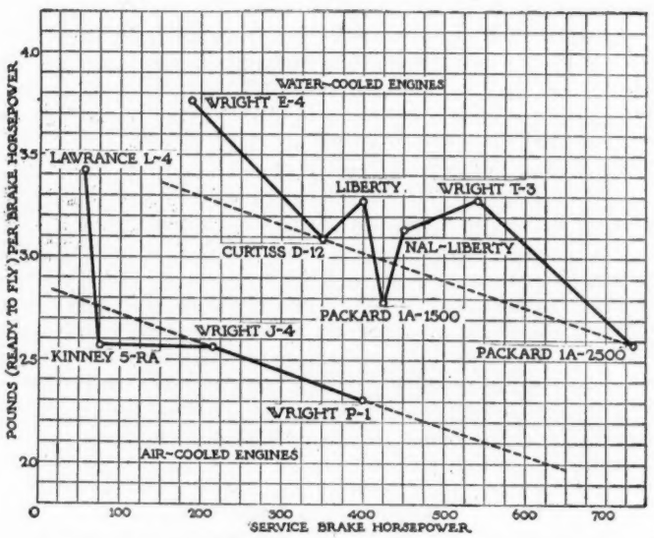
oil-stoning, had to be performed to obtain shafts up to the requisite standard.

There is an excellent proprietary method of spline grinding, which did not, however, commend itself, simply because of the company's policy not to allow material once delivered to leave the factory; and to employ this process would have meant breaking the rule, which is essential to maintain full control of output. Form grinding did not appeal, because the requisite experience for maintaining the sharp corners on the emery wheels was not available; hence a new solution had to be found. The problem was solved by milling the form with a pronounced undercut, as shown at *a*, Fig. 5, and then grinding the sides of the keys, as at *b*, indexing, of course, for the remaining keys; the truing is thus performed by a straight movement across the face of the wheels. The remaining operation of grinding the radius becomes an easy process, the shaping of the wheel being reduced to a simple radius, instead of form trimming.

Another special machine was developed to grind the face and bore of the magneto pinion. This was brought into being to avoid the pitfalls inherent in setting up on two machines. It is essential that the bore should be at right angles to the face of the gear, which is of cup form. Fig. 4 illustrates how, by the use of a duplex slide, this is achieved at one setting; the lower and larger wheel is used for face grinding, the upper wheel for the hole.

Incidentally, it may be mentioned that these machines are now on the open market. This fact goes to prove that the larger producer helps the smaller by taking up problems which, by the very bulk of quantities, clamor for a solution; the lesser manufacturer eventually benefits and avoids the trials attendant upon new ventures.

Aircraft Engine Weights



Specific weights of engines ready to fly, less fuel and oil system

IN a paper on "Aircraft Engine Design" by E. E. Wilson of the Bureau of Aeronautics, published by the National Advisory Committee for Aeronautics, a graph is shown in which the weight per horsepower of aircraft engines is plotted against the service brake horsepower. The weight per horsepower of the engine is taken with the engine in condition ready to fly, that is, in the case of water cooled engines it includes the whole of the cooling system.

Points are plotted for a number of both air cooled and water cooled engines, and lines are then drawn to represent the average weights of engines of the two classes for different output ratings. Quite naturally, the weights decline as the power ratings go up, and it will also be noticed that the air cooled engines in the condition ready to fly weigh materially less than the water cooled engines.

With the number of "observation points" as limited as it is, it is difficult to draw an accurate mean line, but it might be observed that actual progress in weight reduction with increase in output should follow a curve convex to the horizontal axis rather than a straight line.

Novel Door Construction Appears in New Bauer Taxicab

Any passenger can enter and leave cab without disturbing the other occupants. Special provisions made for carrying trunks and luggage on running board. Power plant is built by Buda.

THE Bauer Taxicab Mfg. Co. of Chicago has recently placed on the market a five-passenger taxicab of 115-in. wheelbase, powered with a Buda four-cylinder engine. Incorporated in the design of the new vehicle are two body features on which patent applications have been made. The chassis is conventional in design, employing the rugged axle and frame units usual in American-built vehicles of this type. The body features center around the seating arrangements made possible by the patented method of fitting the doors.

There are two doors—one on the left side, which is in the usual position, but cannot be opened from the inside, and a second in the front of the body, on the right-hand side. This front door is hinged to a pillar directly behind the driver's seat and opens forward. The abutment pillar on the outside is about 14 in. further back than the hinges, thus placing the door at an angle and giving considerable luggage storage space without obstructing the passenger entrance.

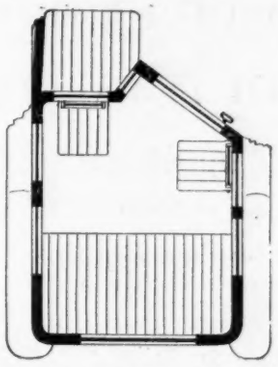
The seating arrangement used in connection with the door layout is shown in the accompanying illustration. Anyone of the five passengers can leave and reenter the car without disturbing the others. It is claimed by the manufacturers that the door layout makes possible a very rigid body of light weight, and that the front door, by virtue of its location, is immune to rattle and strain induced by weave and distortion of the frame rails. The left half of the front compartment is occupied by the driver's seat, while the space on the right is available for stowing a steamer trunk and small luggage.

To eliminate obstruction in the entrance way, the right-hand running board is extended forward to a point slightly behind the end of the engine hood. The forward or luggage carrying end of this running board is provided with cast aluminum carrier guards to retain the small baggage. A special strapping device anchored to the side of the cowl panel accommodates a regular sized steamer trunk. Both right and left-hand running boards are of heavy gage steel and bolted direct to the frame.

The body is regularly finished in black Duco with red stripes, but any desired color scheme can be applied. Wheels are Budd steel disk, fitted with 30 x 5-in. seven-ply cord tires. The gasoline tank of 10-gal. capacity is mounted in the cowl, to give gravity feed to the Zenith carbureter. The interior finish of the body includes Spanish blue hand buffed leather for all seat and back cushions. Roof sides, back and doors are upholstered in an imitation leather to match. All rear upholstering is removable, to facilitate body repairs. Aluminum kick plates, 9 in. high, are used all around the bottom of the rear or passenger compartment. A heater of large capacity, sole leather floor mat, dome and "Vacant" signs and two storm curtains for the driver's compartment are regular equipment. The roof is of laminated construction, designed to reduce "drumming."

The chassis frame slide rails are pressed steel of 3/16-in. stock, 6 in. deep with 2½-in. flange. The rails are reinforced by wide gussets and four cross members, the center one of which is tubular.

The power plant, including a Buda 3¾ by 5⅛-in. pressure lubricated engine, Borg & Borg single plate clutch, and Muncie three-speed transmission, is mounted at an angle to give a theoretical straight line drive to the rear axle, which is a Columbia model 53000 full floating type. The drive shaft connecting the transmission to the axle

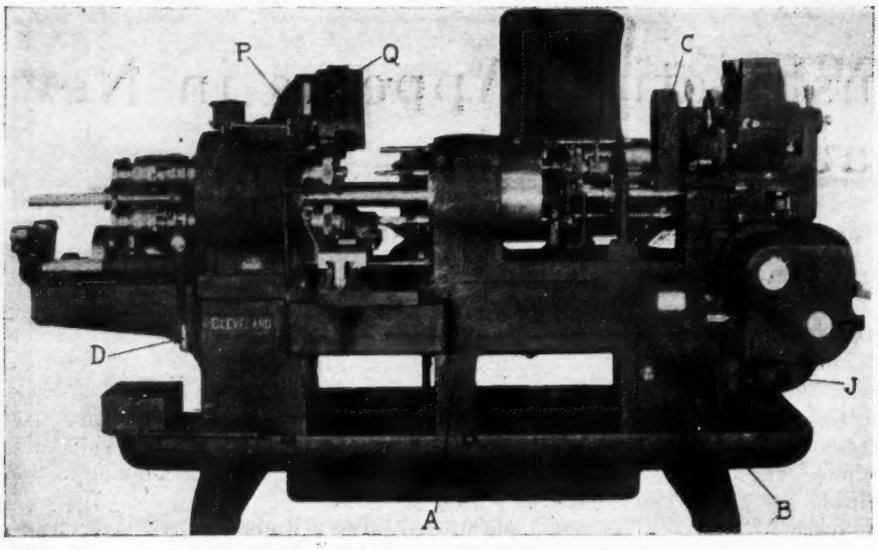


Showing strapping devices for steamer trunk and collapsible running board for smaller baggage

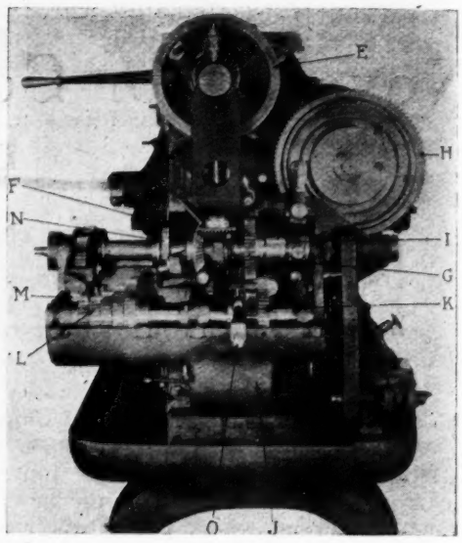
is of one-piece tubular construction with a Pick fabric universal joint at each end. The shaft is exposed and both torque and propulsion are taken by the springs. Front and rear springs are semi-elliptic of silico chrome manganese steel, measuring 33 by 2½ and 55½ by 2½ in. respectively. Metal shackles with Alemite chassis lubrication are used.

The service brakes are of the contracting type and act on 16 by 2½-in. drums on the rear wheels. The emergency brake acts on an 8 by 2-in. drum on the transmission case and is of the contracting type. Both the front and rear axles are machined to receive mechanically operated four-wheel brakes, which are available at extra cost.

MAGNESIUM is now being used for the rotors of centrifugal air pumps used as superchargers on aircraft engines. The stresses on the vanes of these rotors are directly proportionate to their weight, and as magnesium has a specific gravity of only about 2, the stresses are much less than with either aluminum or steel rotors running at the same speed. Even though the tensile strength of magnesium is less than that of the other two metals mentioned, it seems that at the same speed the factor of safety is materially greater with magnesium, and a greater maximum speed is therefore permissible with this metal.



Front view of Cleveland multiple spindle automatic screw machine



Indexing and feed mechanism of the automatic screw machine

Compact Design and Great Rigidity Features of New Automatic Screw Machine

Chip pan has ample capacity and a special slide for eliminating chips when filled. Tool has high speed indexing and low speed feed mechanism. Seven spindles and ten speed changes employed.

A NEW four-spindle automatic screw machine, known as the 1½ in. Model M, has been brought out by the Cleveland Automatic Machine Co. It is primarily a production tool and is of compact design, the floor space occupied being only 116 by 42 in. To permit use of high speed tools to the limit of their capacity and at the same time to turn out work to close limits of accuracy, all parts of the machine are designed for great rigidity.

One feature of the new machine resides in the provision made for the reception of chips. The chip pan under the tool heads affords considerable capacity itself, but if this becomes filled the chips slide down an inclined surface on the bed casting into a compartment of the bed to the right of the center legs *A*.

Seven changes of spindle speed, ranging from 210 to 751 r.p.m., are made available by change gears, the reserve gears being stored in a compartment of the bed rendered accessible through the door *B*. The spindle driving gears are protected by the case *C*, and similar protection is provided for all other gears on the machine. Dirt and chips are kept out of the spindle mechanism by a knurled steel guard screwed onto the spindle turret, which can be quickly removed by hand when it is desired to change chucks.

Bronze bushings are pressed on the spindles and hardened steel bushings are fitted in the spindle turret, so the spindle bearings are bronze on hardened steel. Provision is made for taking up both radial freedom and end play.

Lever *D* in the illustration serves for opening and closing the chucks. When it is desired to open the chuck the lever is first swung into a horizontal position, which brings its opposite end into engagement with the grooved collar of the chuck, and lever *D* is then swung sidewise to open the chuck. When the machine is stocked up the spindle turret is indexed to bring one spindle after another into a position where they can be engaged by this lever.

Indexing of the machine is accomplishd rapidly by means of a special set of gears. From the driving pulley *E* the power is transmitted through a vertical shaft with a pair of bevel gears at both top and bottom, to a horizontal shaft and thence through spur gears *G* to a worm meshing with worm wheel *H* on the feed camshaft. These gears run all the time, but as soon as indexing has been accomplished clutch *I* is automatically tripped by adjusting pins on face of worm wheel *H*, and gears then idle.

Feed Per Revolution Uniform

Motion for the working feed is taken directly from the spindle driving gears, and as a result the feed per revolution of the spindle always remains the same, whatever changes may be made in the spindle speed. The power for the feed motion is transmitted from the spindle change gears in case *C* to a vertical shaft through a pair of bevel gears. At the lower end of this shaft is a worm which meshes with a worm wheel in case *J*, and from the latter the drive is through one or the other of two pairs of sliding gears *K* through a cluster gear *L* and through intermediate gears controlled by lever *M* to a cross shaft with ratchet *N*.

The driving gears for the feed also run continuously, but the disengagement of the indexing clutch automatically stops a spider secured to the back of the driven bevel gear *F*, and ratchet *H* then engages the pawl. Power is then transmitted through the worm to worm wheel *H*.

Tumbler gears controlled by lever *M* and meshing with one or the other of the cluster of gears *L* provide five different rates of feed. As the cluster gears are driven through one or the other of the two sliding gears *K*, which have speeds in the ratio of 1 to 2, there are really ten feeds.

All cams are mounted on a camshaft at the back of the machine and are therefore unusually accessible for purposes of adjustment. Coolant is delivered by a pump through individual pipes directly to the cutting points of the tools. In the case of the threading spindle the oil is delivered through the spindle to the center of the die and not only serves to lubricate the chasers but also washes away the chips.

The machine has three slides, for roughing, finishing and cut-off tools, respectively. The finishing slide is carried by bracket *P* in the photo. Sliding plate *Q* has a cam action which is so arranged that it is not set in vibration by forming operations. As regards the capacity of the machine, the rating of 1½ in. refers, of course, to round stock. Hexagon stock up to 1¼ in. can be handled and square stock up to 1 1/16 in. The feed is limited to 8 in. in length and milling operations are limited to 6 in. Where individual motor drive is desired a 10 hp. 1800 r.p.m. motor should be used.

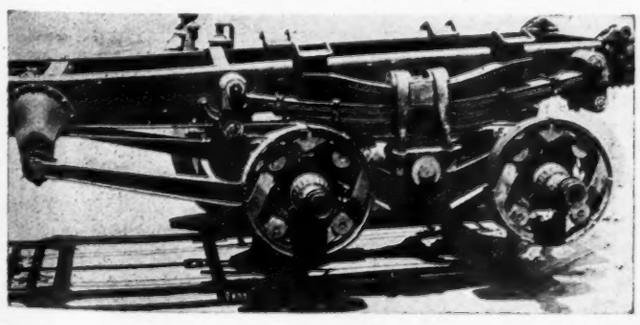
Moreland Truck Has Six Wheels and Weighs 14,000 lbs.

IN a paper detailing the advantages of six-wheel trucks, presented recently by Ethelbert Favary, consulting engineer of the Moreland Motor Truck Co., before members of the Society of Automotive Engineers during the first meeting of this organization ever held in Los Angeles, some particulars concerning a Moreland six-wheel 10-ton truck were given.

This truck is said to weigh 14,000 lb., so that, when fully loaded, the total weight on all six wheels is 34,000 lb. In one weighing of this truck, fully loaded, the weight on the two front wheels is said to have been 7070 lb. and on the rear wheels 27,450 lb.

From the accompanying photograph of the rear end of this truck it will be seen that the two rear axles are joined by a heavy distance piece pivoted at its center and connected to the axles by ball and socket joints at each end. This member carries above a progressive type spring, the upper portion of which comes into action only when heavy loads are being carried. Radius rods are employed to take the drive and to position the forward one of the two rear axles in reference to the frame.

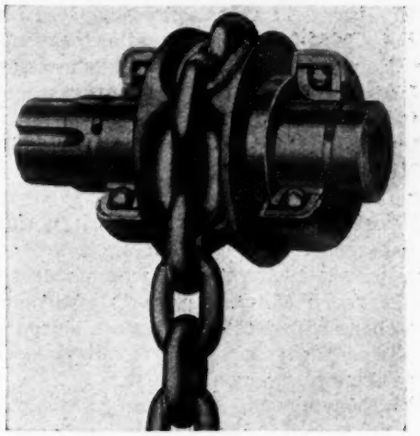
Brakes are air operated and act on each of the driving wheels. The air compressor is mounted on the side of the gearset. Rear wheels are only 40 in. apart, center to center, and it is claimed that no sliding of the wheels takes place when the truck rounds a corner. Impressions made by the rear tires, which were covered with paint to make the test, are said to prove this fact conclusively. Evidently there is sufficient give in the spring and other parts to permit the wheels to accommodate themselves to a correct relative position in traveling around a curve, Mr. Favary contends.



Rear end of Moreland ten-ton six-wheel truck. Note construction of spring and of member connecting two rear axles. This member is connected to axles by ball and socket joints

Yale & Towne Chain Block Equipped With Ball Bearings

THE Yale & Towne Mfg. Co. of Stamford, Conn., has recently designed and placed on the market a new ball-bearing chain block in which ball bearings support the load sheave and the full load on the block. The manufacturers claim that the use of ball bearings reduces the friction, so that less pull on the chain is required to lift any given load, and that the life of the block is increased. The bearings are so mounted that they are rigidly held in place, and felt washers are provided to exclude dust. Continuous lubrication of the bearings, driving pinion, shaft and planetary transmission is provided for. These blocks are built in a number of sizes ranging from ¼ to 20 tons.



Showing ball bearings supporting load sheave of new Yale & Towne chain block

TRIALS for light airplanes with engines of not over 67.2 cu. in. piston displacement were held at Lympne, England, recently. The Air Ministry prize of £2,000 was won by a Beardmore Wee Bee monoplane with a Bristol Cherub engine driving its propeller directly. This machine made a speed of 70.11 m.p.h. in the high speed test and also had the highest total marks. The total distance covered was 737 miles. Second place was secured by a Bristol-Browne monoplane, also with a Cherub engine, while a Hawker biplane fitted with an A. B. C. engine won second place in the test for getting off and landing qualities, in which the Bristol Browne won first place. Each of the planes had dual control and carried two men.

WE are informed that the statement made in our issue of the 15th inst. that the Fiat Automobile Co. would open a direct factory branch in this country is not quite correct. While Fiat cars are at present being exhibited in New York for the account of the Turin company it is not the intention to open a factory branch here, but it is hoped to make arrangements whereby the Fiat will be handled in this country by a private corporation having no direct connection with the Turin firm.

Tractor Design Has Developed Steadily, but Along Conservative Lines

Improvements made in many models during last year despite the fact that sales have not been good. Changes made in Best, Hart-Parr, Eagle, Russell, Nichols & Shepard, Townsend, and Fageol.

By P. M. Heldt

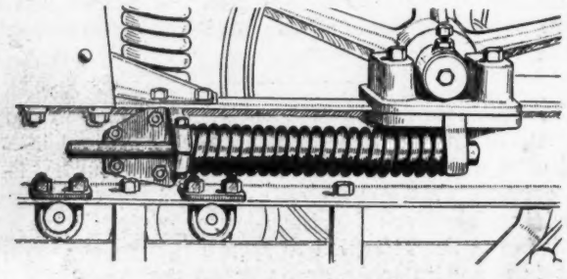
VARIOUS improvements have been made in the Best Thirty and the Best Sixty creeper track models, built by the C. L. Best Tractor Co., San Leandro, Cal. On both models the front idler bearings now are equipped with cushion springs, which allow them to yield if an obstruction gets between the track and sprocket. This feature enables the tractor to work and turn short in loose ground or snow without having to replace the tightener pins, as was formerly necessary. The movement of the idler is entirely automatic; it will return to its normal position as soon as the obstruction has been removed. The reaction of the spring is taken on a drop-forged steel bracket bolted to the web of the side channel. The front idlers have been greatly strengthened.

The Stromberg carbureter has been adopted as standard equipment. The governor spring is now entirely inclosed, so the driver cannot tamper with it.

The roller bearings of the track are now protected against the entrance of dirt by an improved seal which is expected to more than double the life of the bearings. Two cork seals are used, of triangular cross section, reacting against each other in such a way that their combined cross section is rectangular. They are located between the end of the roller hub and the stationary end collar. Against the outer one of the cork seals bears a flat steel washer, and against the latter bear two small coil springs located in recesses in the end collar. These springs acting through the steel washer, keep the two cork seals pressed together and tend to spread them radially so as to close up the space between hub and collar and thus prevent the entrance of dust. These cork seals are inexpensive and easily replaceable, and it is expected that they will be long-lived, provided lubrication of the track is properly attended to.

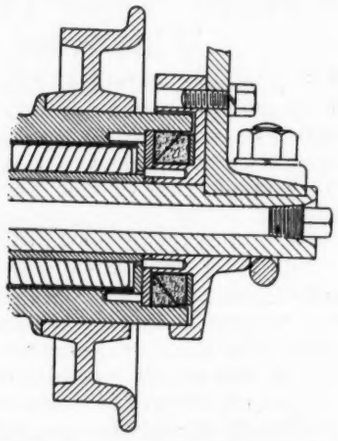
Larger bearings now are used in the track rollers on the Thirty. On the Sixty the track roller shafts are now made with a flat on each side so they can be reversed when one side is worn.

The Sixty engine has been redesigned to bring it in line with the latest practice. The crankcase has been strengthened and made more rigid, and the crankshaft has been increased in diameter from 3 to 3¾ in., which has brought its weight up from 174 to 296 lbs. The center and rear bearings are 6 in. long each, and the front bearing 4¾ in. The bearing surface of the center bearing has been increased by 53.8 per cent as compared with the former design, by increases in both the diameter and length. The bearings are now supported in cross girder type walls and the caps are held in place by alloy steel studs with castellated nuts of extra length.



Cushion spring on front idler bearing of Best tractor

Pressure lubrication is used in the new engine. A large oil strainer of the bucket type is placed between the crank and the sump, and is easily removable for cleaning. The pistons have four rings above the pin and an oil scraper ring below it. The main and connecting rod bearings are of such design that the babbitt does not overhang the bearing, which eliminates all danger of the ends or flanges breaking off if the bearing is operated in a loose condition. The rear bearing is provided with an oil seal which prevents leakage of oil from the crank case even if the tractor is on a steep up-grade. Silcrome steel exhaust valves are used.



Cork seal for roller bearing of track wheel on Best tractor

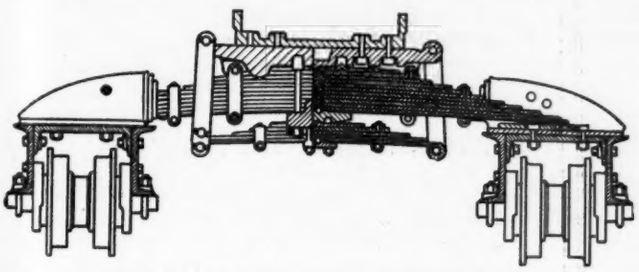
At the rear the engine is supported by two brackets bolted to the sides of the crankcase and resting directly on the main frame. At the front the support is on a frame cross member, and heavy coiled springs are placed under the holding down nuts to prevent undue strains on the motor due to twisting of the frame. A new intake manifold has been adopted, which provides for heating of the intake air when the engine is idling and gradually cutting down the heat as the load on the engine is increased. The air cleaner has been increased in size. The valve lift is now 9/16 in. instead of ⅜ in. These changes have made it possible to raise the belt horsepower of the engine to 72.

The strut rod on the Sixty is carried in brackets which are bolted to the top instead of to the sides of the swing frame channels. This raises the strut several inches and

greatly diminishes the danger of bending it in collision with stumps, stones etc.

The main frame of the Sixty is bolted together, which makes it easy to dismantle the frame if occasion should arise. The Sixty equalizer bar is carried on two heavy ship channels which are bolted to two heavy brackets riveted to the inside of the frame. The equalizer pin is flattened at each end and is held in place with U bolts.

The Thirty engine also has been refined, among the new features being longer pistons and increased compression,



Spring support of power unit on Best Thirty

which latter, together with the use of a Stromberg carbureter, is said to enable the engine to develop 25 hp. on the drawbar. Water now circulates entirely around the valve seats. An eight-blade fan has replaced the former four-blade design.

Heavier angle iron braces are used between the swing frames and the sprocket shaft and heavier reinforcing braces between the trucks and the inside swing frame boxes. These braces are heat-treated steel castings and are secured with nickel steel heat-treated bolts.

The Thirty engine and transmission unit is now supported on a heavy alloy steel leaf spring, which is so mounted that it can oscillate. The main spring is held in place on a cam-shaped bracket and its movement is controlled by a supplementary leaf spring mounted under the main spring. This supplementary spring dampens the oscillations of the main spring. The two springs are held together by alloy steel clips. This spring support, which takes the place of the former solid equalizer bar, is said to be one of the most important recent improvements in the design of the tractor and to add greatly to the ease of riding on rough ground.

The sprocket shaft now has a bearing at the center, which gives a better support to the inside swing frame bearings. Improved dirt guards are placed around the sprockets and help to keep dirt out of the tracks. The track centers are 2 in. wider and the over-all width on the ground is 4½ in. more. The width of the track shoe has been increased from 11½ to 13 in. and the track shoes are held on the links by nickel steel heat-treated bolts.

The most important change in the Thirty tractor is held to be the addition of a third gear, the three forward speeds at normal engine speed now being 1¾, 2⅝ and 3⅝ m.p.h. Gears of heavier pitch are used in the transmission and final drive. The bull pinion is supported in bearings on opposite sides, instead of overhanging its bearing, and adjustable roller bearings are used on both sides of the bevel gear and in the sprocket hub.

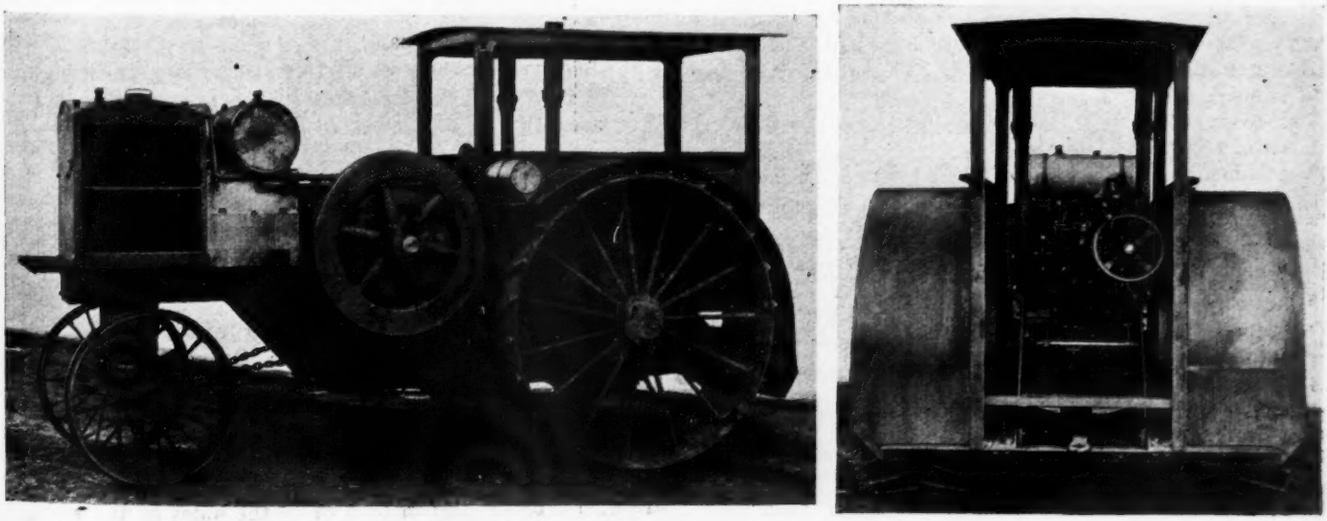
Nichols & Shepard

The Nichols & Shepard Co. of Battle Creek, Mich., who have been manufacturing a 20-42 hp. tractor for a good many years, during the past year added a 25-50 hp. model of the same general design, the engines of both machines being of the low speed, heavy duty type. The engine is of the two-cylinder horizontal type with a bore of 9 in. and a stroke of 12 in. The valves are in the head and the crank throws are set at 180 deg. The normal engine speed is 400 r.p.m.

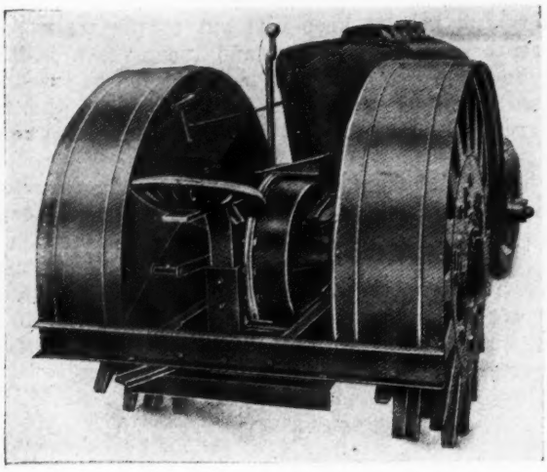
There are two contracting band clutches on the crankshaft. The one for belt work is in the pulley, while the one for the main drive to the rear wheels is built integral with the flywheel. The engine is mounted crosswise of the frame and the drive to the traction wheels is entirely through spur gears. No bevel gears are used on this tractor, even the differential being of the spur pinion type. It is located on the shaft carrying the bull pinions.

Twin-City

The Minneapolis Steel & Machinery Co. continues its 12-20 and 20-35 hp. models, in which minor changes have been made from time to time, partly to take advantage of lessons learned by experience and partly to adapt them to special applications. Road work, for instance, has necessitated the development of special wheels, canopies, curtain inclosures, more comfortable seats and more rugged steering gears. The 12-20 model has been adapted to orchard work by the provision of smaller wheels, the lowering of the top tank of the radiator and changes in the fuel tank



Two views of the Nichols-Shepard 25-50 hp. tractor with low-speed engine



Rear view of Fageol tractor showing new arrangement of seat and control members

and the engine hood. The width of the tractor has also been decreased by 10 in. This model is known as the orchard type and differs materially in appearance from the standard type, although practically all of the components are the same. The chief aim has been to reduce the bulk of the machine in every way, so as to adapt it to peculiar conditions met with in vineyard and orchard work.

Various changes have been made in the engines to improve their performance. The capacity of the cooling system on the 20-35 hp. has been increased, changes have been made in the fender and platform equipment of both sizes, in order to afford greater comfort for the operators, and a power take-off has been developed for the 12-20 model. Slight changes have been made also in the transmission parts to increase their strength, chiefly changes in materials and in heat treatment.

Fageol

Quite a number of improvements have been made in the Fageol tractor, manufactured by Great Western Motors, Inc., of San Jose, Cal. The new model Lycoming engine with five crankshaft bearings, force feed instead of splash lubrication, and a bore of 3¾ instead of 3½ in. has been adpoted. A Pierce engine governor is now standard equipment. The gasoline tank capacity has been increased from 12 to 17 gal. and the drawbar rating is now 10 hp. or 1500 lb. at 2½ m.p.h.

Five-inch instead of 4-inch frame channels are now used, and the method of fastening the transmission to the frame has been improved. The bevel gears and the bevel pinion shaft have been enlarged. The fabric disks of the universal joint can now be removed readily. An improved swinging, solid tongue drawbar is provided which can be readily adjusted for side draft.

What is probably the most important change relates to the seating arrangement and the location of the controls. The operator is now seated much lower to the ground and closer to the implement, which is said to materially improve the control of the implement. An incidental advantage of the lower seat is that the operator clears the branches of trees better when working in orchards.

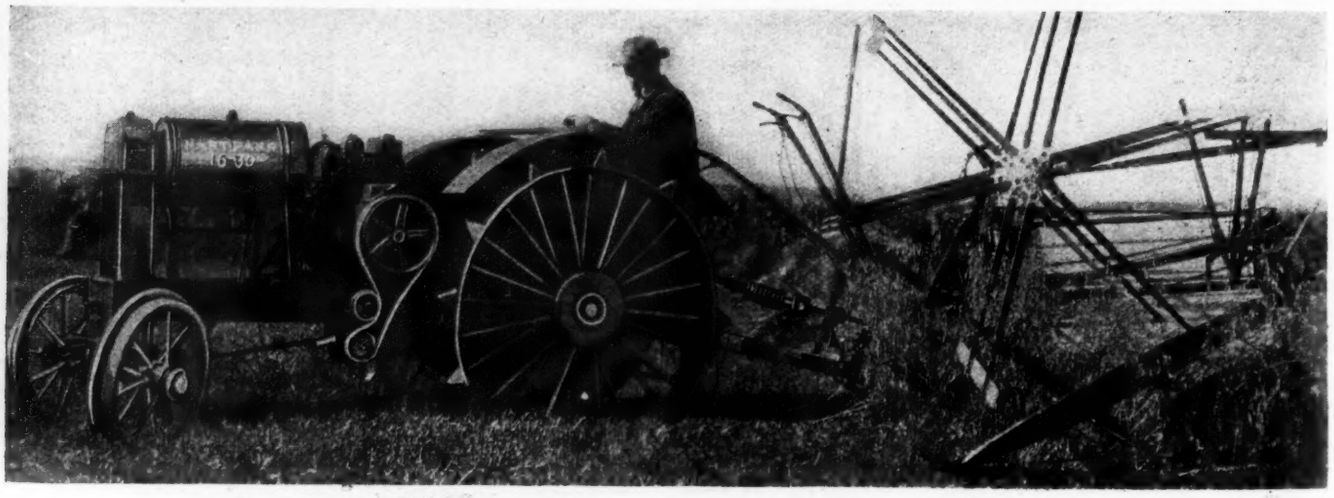
McCormick-Deering

The new line of the McCormick-Deering tractor has been fully described in AUTOMOTIVE INDUSTRIES and no important changes in design have been made in these tractors since they were brought out. The company feels that one of the most important features of the tractors is the power take-off. This feature of the tractor is used when hauling grain binders, corn pickers, spraying outfits, etc. Sawmill owners use it to operate cut-off saws and edgers and road builders use it to operate concrete mixers.

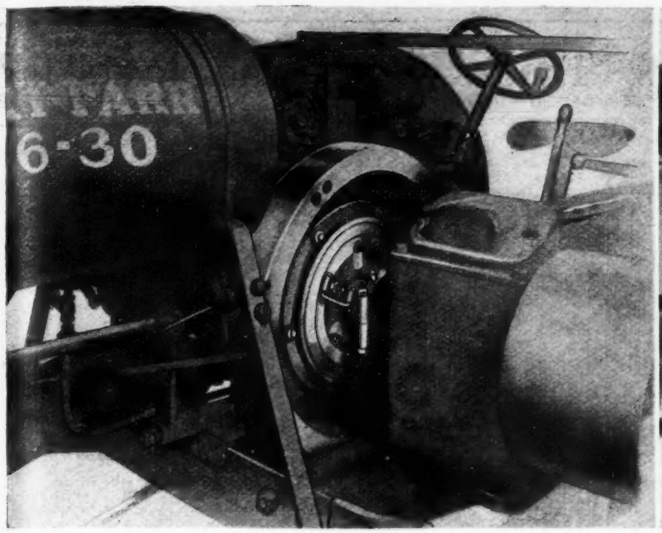
Hart-Parr

The Hart-Parr Co. of Charles City, Iowa, who originally marketed only one size of tractor of 16-30 hp. rating and then added a smaller 12-20 model, since the last tractor show have come out with a larger model of 22-40 hp. rating, so that they now have a line comprising three models. The new model has a four-cylinder engine which, like the engines of the other two, is of the horizontal type. The cylinders, pistons and connecting rods are the same as used in the 20 hp. engine, which tends toward simplification in manufacture and servicing. The company state that since they were already in production on nearly all of the parts used in the new model, they were in position to offer it at a comparatively low price.

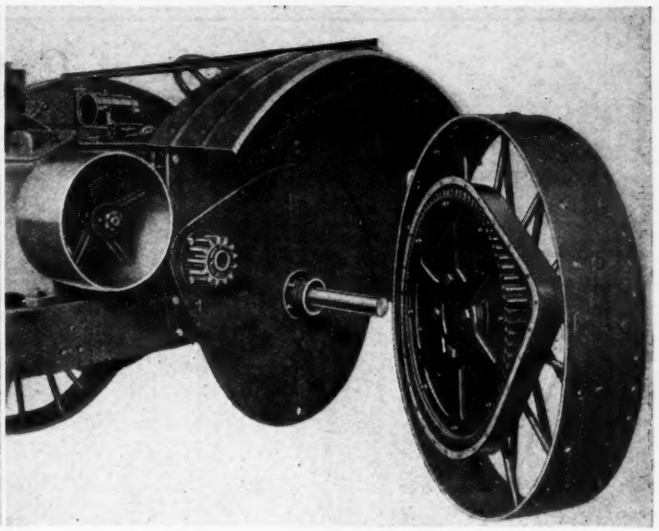
Except for some details, the transmission of this new model is the same as that used on the 16-30 tractor, this being made possible by the smoother flow of power in the four-cylinder engine as compared with the two-cylinder type. While the company have made a departure from their past practice in going to the four-cylinder engine,



Hart-Parr power take-off used on grain binder



Hart-Parr disk clutch



Hart-Parr final drive gear inclosure

they have endeavored to retain as many of the old features as possible; they feel that the merits of their construction have been proved by the fact that it has held its own in spite of a strong tendency toward the automobile type of construction.

A number of changes have been made in the general design of this tractor. Thus, a disk type of clutch has replaced the band type formerly used. Formerly the tractor frame was made of cast steel, but it is now built up of steel channels. All operating parts, such as the valve levers, push rods and final drive gears, are fully inclosed. A cast iron radiator shell has been substituted for the sheet metal type formerly used, and a new design of governor with ball thrust bearings is fitted.

A power take-off has been worked out by the engineering department of the company, which is easily applied to their tractors. This gives a shaft speed which is a function of the engine speed and entirely independent of the tractor speed. The power take-off can be operated or disengaged at will whenever the main clutch is engaged; that is, it can be used whether the tractor is in neutral or operating in any gear.

Eagle

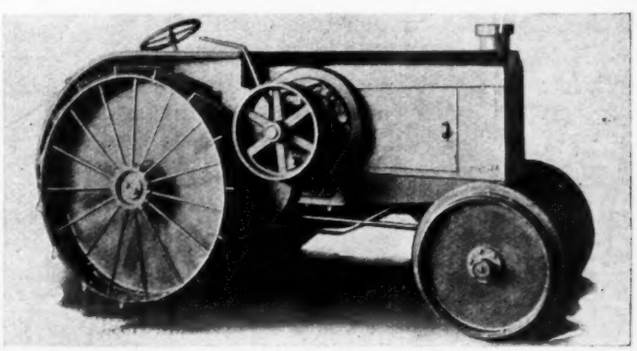
The Eagle Mfg. Co. of Appleton, Wis., have made numerous changes in the design of their tractor which is now turned out in three sizes. Among the most important are the adoption of an automobile steering type front axle and a live rear axle. The bull gears are now fully inclosed, and so are the magneto drive gears. The fan and pump are now driven by belt directly from the engine crankshaft, instead of from the magneto shaft, and an automatic belt tightener has been provided. This change has removed the extra strains from the magneto shaft and drive gears. The Pickering governor with safety device is now standard equipment.

Russell

The Russell & Co. have a line of four tractors ranging in rating from 12-24 to 30-60 hp. The design of the 20-40 model has been changed to bring it in line with that of the 15-30 hp. model, or, as the company express it, the 20-40 has been changed from a Model B to a Model C. The newer type has knuckle steering, higher front wheels, an inclosed steering gear with all parts hardened and working in a bath of oil, a larger steering wheel, a more substantially supported rear axle and other refinements. This tractor has a four-cylinder 5½ by 7 in. engine and weighs 7600 lb. with smooth rear wheels.

Townsend

The Townsend Tractor Co. of Janesville, Wis., who turn out a line of oil tractors which resemble steam traction engines in appearance, have added a new model known as the Townsend, Jr. It is a two-plow tractor fitted with a single cylinder horizontal 7½ by 9 in. engine running at 475 to 550 r.p.m. The cylinder block and water jacket are cast in a single piece, but the cylinder head is separate. Valves are located in the head and the cooling water circulates around the valve seats and stem guides. The two main bearings measure 3½ by 6 in. and the connecting rod bearing 3½ by 2½ in. Among the engine accessories may be mentioned a mechanical oiler, high tension magneto with impulse starter and an automatic throttling



The Townsend, Jr., a new low priced two-plow tractor

governor. The crankshaft and connecting rod bearings have renewable babbit liners.

All gears of the transmission are inclosed. The drive pinions and differential parts are of steel, and all gears except those of the final drive have cut teeth. The bottom of the belt pulley is 2 in. above the front wheel rim. Drive wheel lugs and front wheel guide flange are removable. Transmission is by spur gears throughout, but the differential is of the bevel pinion type.

Cylinder walls and the piston pin bearing are lubricated by fresh oil from the mechanical oiler.

Exports of Cars, Trucks, Tires and Parts for

COUNTRIES	GASOLINE PASSENGER CARS								TRUCKS						ELECTRIC VEHICLES	
	Up to $500		$500 to $800		$800 to $2000		Over $2000		Up to 1 ton incl.		1 to 2½ tons		Over 2½ tons			
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Austria																
Azores and Madeira Islands	4	$1,492			2	$3,641			1	$400						
Belgium			36	$26,393	43	51,611	10	$33,128	10	6,728						
Bulgaria					1	1,267										
Czechoslovakia					1	1,062										
Denmark	1	350	26	20,178	43	49,432	1	4,582	1	1,100			2	$3,965		
Finland			2	1,737	3	3,125										
France					69	86,402	1	6,000								
Germany	6	3,295	53	41,640	94	120,624	20	55,446			3	$3,306				
Gibraltar			2	1,671												
Greece	8	3,836	35	24,725	25	27,525	2	5,025	6	3,831	2	3,308				
Hungary					1	1,419										
Iceland	1	513														
Italy					6	7,066										
Latvia																
Lithuania																
Malta, Gozo and Cyprus Islands	7	2,649			3	2,674										
Netherlands			32	23,638	80	107,190	6	17,119								
Norway			3	2,350			1	2,175			1	1,620				
Poland and Danzig			6	3,781	3	4,585			1	860	1	1,424				
Portugal	15	7,925	5	4,037	15	16,262										
Rumania			2	1,148	5	5,946	2	6,022								
Spain	142	51,926	115	89,697	267	354,048	25	68,380	108	33,311	10	11,731				
Sweden	7	2,852	46	35,421	69	75,697	4	10,761	4	2,072	2	2,792				
Switzerland			23	15,516	89	107,127	3	9,940								
Turkey					1	1,262										
England	19	8,959	256	178,775	462	610,395	7	23,124	50	27,464						
Scotland																
Ireland					3	2,788										
Yugoslavia, etc.			2	1,148												
United States																
Canada	38	9,623	65	45,150	161	187,271	59	170,130	10	6,931	29	41,963	6	18,097		
British Honduras	1	300	1	700	1	1,460	1	2,020	1	439						
Costa Rica			4	2,377	4	3,926			1	500						
Guatemala	10	3,073	13	10,021	44	54,585					11	14,535				
Honduras					1	1,200			2	877			3	12,202		
Nicaragua	2	315	1	800	6	6,026			1	580						
Panama	12	4,498	11	7,739	19	23,753			11	4,584						
Salvador	4	2,000	14	10,727	35	35,014	2	5,025					1	4,930		
Mexico	397	130,908	108	76,093	243	279,902	18	56,437	185	71,283	15	25,023	4	3,275	1	$395
Newfoundland and Labrador	1	400			1	1,072										
Barbados	5	2,245	1	624	9	10,470			2	712						
Jamaica	12	4,195	9	7,308	20	22,448			5	1,780	1	2,000				
Trinidad and Tobago	11	3,775	4	3,279	7	7,860					1	1,186				
Other British West Indies	12	4,223	1	660	2	2,578			9	2,513						
Cuba	168	47,560	82	55,015	87	99,463	19	62,410	57	29,403	9	11,701	5	12,088		
Dominican Republic	44	15,640	5	4,355	10	12,751	5	13,742	20	7,080	2	1,974				
Dutch West Indies	7	2,601	3	1,950	3	3,350	1	3,742	7	2,944						
French West Indies	1	360			3	3,024			2	812						
Haiti	5	2,115	3	1,900	6	7,222			3	1,232	2	2,848				
Virgin Islands					1	1,301										
Argentina	186	93,054	375	280,029	569	738,373	30	79,142	11	11,585	17	28,979	17	49,464		
Bolivia					2	2,488					3	6,430				
Brazil	184	54,610	198	140,386	358	391,732	34	89,506	138	46,984	10	11,960	2	5,194		
Chile	235	51,099	18	14,126	48	59,165	8	20,624	94	25,842	15	16,302	8	13,542		
Colombia	20	7,477	10	6,997	41	51,984	2	5,065	9	4,336	6	8,372	1	3,000		
Ecuador			3	2,196	7	8,251			10	3,944						
British Guiana			3	2,307	3	3,382					2	2,256				
Dutch Guiana					1	1,539										
French Guiana																
Paraguay																
Peru	51	18,759	18	14,739	50	59,524	7	25,162	56	26,903	80	100,718	5	18,429		
Uruguay	389	105,366	73	50,532	95	116,289	3	7,500	78	20,638	6	6,566				
Venezuela	31	11,563	10	6,338	40	48,338	6	16,466	29	18,988	7	10,580	1	4,220		
Aden					1	1,183										
British India			91	71,953	54	62,342			49	33,038	6	6,766				
Ceylon			15	12,206	24	28,709			36	34,663	20	25,912				
Straits Settlements	8	3,330	30	24,451	23	27,508										
Other British East Indies			1	803	2	1,826										
China	15	4,974	9	6,935	28	41,058			9	5,833	5	4,810				
Chosen																
Java and Madura	10	4,802	39	28,360	33	39,588	2	5,000								
Other Dutch East Indies	2	1,057			9	9,516			2	2,532						
French Indo China																
Hejaz, Arabia, etc.	30	10,848	2	1,643	2	2,265										
Hongkong	12	3,930	2	1,830	19	22,097			11	4,432	1	1,815				
Japan			1	776	66	81,415	5	14,876			1	1,850			1	1,121
Kwantung					2	3,485										
Palestine and Syria			1	749	32	37,366										
Persia	3	1,068														
Philippine Islands	53	19,860	40	32,510	99	119,413	9	29,370	40	14,200	5	10,096				
Siam	4	2,180	3	2,720												
Turkey																
Australia	871	319,888	719	503,587	754	902,702	12	29,261	49	31,685	54	71,271	24	55,857		
British Oceania	5	2,180	2	1,716	1	1,160										
French Oceania	1	450			1	1,375									1	825
New Zealand	77	36,747	83	62,387	196	227,896	2	5,634	11	10,572	21	37,919	1	3,609		
Other Oceania					1	931			2	670						
Abyssinia																
Belgian Congo									3	1,044						
British West Africa	4	2,127	3	2,392	4	4,424			32	30,145	56	66,616				
British South Africa	108	47,912	116	87,725	261	284,891	1	2,444	18	11,536	5	5,166			2	4,004
British East Africa	9	4,664	1	880	21	25,787			10	5,000	2	3,954				
Canary Islands	2	1,000	2	1,339	4	5,053										
Egypt			18	11,485	4	4,532			4	2,000						
Algeria and Tunis																
Other French Africa	28	8,808	1	798					44	12,532						
Liberia					1	1,595										
Morocco	1	482	5	3,912	1	1,008			6	2,424	2	2,084				
Portuguese East Africa			4	3,083	2	2,925			4	1,835						
Other Portuguese Africa	3	1,447							1	480						
Spanish Africa			6	3,444	2	2,744										
Total	3,282	$1,137,310	2,871	$2,085,887	4,809	$5,831,713	308	$885,258	1,253	$571,277	413	$555,833	80	$207,863	5	$6,345

December, 1924 | Canadian Exports

PARTS	TIRES						PASSENGER CARS						TRUCKS		PARTS	COUNTRIES
	Casings		Inner		Solids		Up to $500		$500 to $1000		$1000 and over					
Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
$82	236	$3,844	23	$141												Austria
588																Azores and Madeira Islands
466,111	517	9,927	717	1,853			12	$4,674			1	$1,360			$45,287	Belgium
	20	208	20	28												Bulgaria
1,177	138	1,803	115	198			2	932								Czechoslovakia
385,813	3,736	40,488	1,891	2,515	67	$20,286	10	3,280							273	Denmark
3,118	143	2,450	143	251	88	2,440			5	$3,400						Finland
385,117	1,887	32,062	1,647	6,962											215	France
28,580	150	3,696	186	592							10	13,473				Germany
																Gibraltar
8,440	83	989	711	1,016	166	4,904			2	1,050	1	1,366				Greece
297																Hungary
479	131	1,921	34	47												Iceland, Faroe Is.
31,206	558	6,106	188	282												Italy
214	134	1,431	195	248												Latvia
125																Lithuania
103	354	3,723	123	196												Malta, Gozo and Cyprus Islands
20,145	776	9,047	301	712	23	606			8	6,335	1	1,287			37	Netherlands
5,836	463	6,608	556	899	106	4,499										Norway
2,559																Poland and Danzig
1,334	113	1,674	172	338												Portugal
2,238	83	1,700	125	365					5	2,627						Rumania
86,548	1,959	34,169	2,196	4,920	337	10,522										Spain
37,890	1,857	30,809	344	688	704	2,727	2	692	5	4,737	10	12,874			144	Sweden
11,072	614	15,186	287	1,395	3	234			12	11,380	4	5,259			9	Switzerland
1,062			25	81												Turkey
323,235	11,458	145,854	5,040	14,808	979	25,402	1	500	135	120,627	7	12,006	101	21,593	117,416	England
3,425	595	5,855			45	1,087										Scotland
10,341																Ireland
	32	395	75	113												Yugoslavia, Albania
							7	1,700			2	3,100	2	1,100	2,241	United States
810,527	4,835	35,799	1,157	1,994	51	2,342										Canada
393	9	142														British Honduras
1,033	65	1,041	66	114	2	39			2	1,895					26	Costa Rica
4,022	105	1,491	158	320												Guatemala
4,459	132	3,856	76	170	30	1,575										Honduras
1,971	75	997	82	128	4	225										Nicaragua
6,140	555	6,753	617	1,055	17	570					2	2,630				Panama
4,344	133	2,399	118	296	12	442										Salvador
101,973	4,741	61,015	6,389	14,032	265	7,029			4	3,800	8	9,724				Mexico
843															611	Newfoundland and Labrador
1,313	89	1,133	73	102					1	967					149	Barbados
11,066	117	1,308	88	157	110	1,996					1	1,348			20	Jamaica
7,540	50	588	9	20	6	182									68	Trinidad and Tobago
3,869	148	1,598	186	293			1	445								Other British West Indies
69,416	4,626	54,203	6,885	10,560	612	21,406			5	4,728	6	7,548			10	Cuba
13,557	1,776	20,685	1,608	2,603	101	2,997	12	4,868	4	2,440					28	Dominican Republic
985	308	3,008	374	580	4	41										Dutch West Indies
1,224	206	2,766	24	71	4	97										French West Indies
5,690	262	4,063	332	586			5	2,080	2	1,036						Haiti
989	44	492	12	24												Virgin Islands
733,058	15,150	126,847	14,147	18,160	847	24,102	100	40,972	81	52,402	32	37,715			113,122	Argentina
4,048	43	600									2	2,621				Bolivia
55,909	2,206	17,608	65	138	77	2,334	10	4,110	49	41,830	25	29,855			53,030	Brazil
36,282	1,180	18,193	445	992	54	1,121			5	4,516	2	2,676				Chile
28,438	703	12,660	1,060	2,277	8	263					9	11,795			78	Colombia
2,523	36	730	154	357											157	Ecuador
1,687	31	321	13	18	4	92	8	3,074	1	505			2	339	81	British Guiana
																Dutch Guiana
640																French Guiana
59																Paraguay
48,843	1,187	21,751	1,262	3,217	90	3,603			9	7,752	3	3,635				Peru
24,716	2,651	30,028	1,601	2,782	108	2,574	35	15,690	14	8,854						Uruguay
21,643	1,232	12,926	1,298	2,187							1	1,287				Venezuela
189	87	791	130	183			5	1,410							37	Aden
37,981	1,415	16,316	1,248	2,040	197	4,980	281	103,579	29	23,208	2	2,743	122	42,977	43,165	British India
10,344	1,024	14,126	544	2,256	65	1,704	26	8,584	4	2,372			12	3,864	6,425	Ceylon
13,958	596	6,987	336	532	99	2,271	200	60,163	5	3,995	2	2,268	36	11,762	9,395	Straits Settlements
217																Other British East Indies
6,906	862	10,868	608	1,116					1	649						China
114																Chosen
21,988	1,428	14,124	67	303	287	6,719	289	87,823	8	5,531	6	8,174	55	18,870	25,627	Java and Madura
2,181	20	351	29	53	14	629										Other Dutch East Indies
461																French Indo China
3,094	20	164	50	59												Hejaz, Arabia, etc.
3,326																Hongkong
63,110	2,090	17,658	1,502	1,738	48	1,467									57	Japan
1,060	2	30														Kwantung
8,902	296	5,806	437	1,104			1	419	3	1,631					18	Palestine and Syria
																Persia
25,569	4,402	53,882	2,515	3,979	249	5,583										Philippine Islands
32							24	6,770					18	5,796	3,621	Siam
617																Turkey
172,489	11,308	150,089	2,557	5,824	643	18,382	628	182,990			3	3,313	392	144,482	74,800	Australia
1,335	18	248	11	23												British Oceania
1,315	2	46	39	41	16	748										French Oceania
50,696	2,042	27,317	2,423	5,156	446	15,384	715	265,420	468	377,350	45	55,823	120	43,825	18,864	New Zealand
434	22	247					9	2,609	2	1,080			9	2,889	952	Other Oceania
	8	97														Abyssinia
371																Belgian Congo
7,172	236	3,394	782	1,313			89	19,958					9	3,408	1,583	British West Africa
99,351	2,574	34,569	4,195	7,310	18	537	158	66,511	68	36,998	5	6,293			106,579	British South Africa
8,936	359	4,977	346	723	2	224	43	16,844	3	1,989			42	15,054	49	British East Africa
6,150	189	2,903	74	220	15	631			1	646						Canary Islands
6,962	135	2,078	162	343	10	283	15	7,055	14	7,540						Egypt
1,856																Algeria and Tunis
1,860													5	1,192	224	Other French Africa
26															15	Liberia
3,403																Morocco
1,796	64	509	115	149			27	11,748	7	3,703						Portuguese East Africa
537	63	733	141	195												Other Portuguese Africa
7,528																Spanish Africa
$4,798,681	97,994	$1,173,256	71,724	$136,541	6,409	$187,279	2,695	$924,900	962	$747,573	190	$240,173	925	$317,591	$524,413	Total

Disadvantages of German Type Filling Stations Pointed Out

Editor, AUTOMOTIVE INDUSTRIES:

I have with interest read your notice, "German Filling Stations Increasing," and beg to state that the information given is not quite correct. In 1910 there were a considerable number of petrol tanks working in Berlin, but they were of quite another type than the standard American filling stations.

Like the latter, the tanks were underground, but instead of by a pump the gas was driven out by carbonic dioxide or nitrogen supplied in high pressure flasks. All pipes and armature were mantled, the gasoline being inside and completely surrounded by a jacket of CO_2 or N_2. Thus complete immunity against fire and explosion risk was obtained, and if by outer force or corrosion a leakage developed either in the outer or the inner tube or both, the pressure was lost and the gas automatically returned to the underground tank.

In a large warehouse fire in Berlin, which was partly used as a garage, the fire lasted several days, but no measurable loss of petrol occurred. The tank contained, if I do not err, about 10,000 American gallons of gas, and there were several tapping valves with an extensive system of piping both on the ground and first floors.

The safety was thus ideal, but as each gallon of gas handled meant an expense of a little more than 1 gallon of CO_2 or N_2 the expense of handling the gasoline was not inconsiderable.

The greatest drawback of the system was, however, that suitable measuring devices acceptable by the State authorities for measures and weights for the use of public sales were not developed. Although the security of the system against fire risk was ideal the German system was not able to hold its own.

I do not know, unfortunately, the exact number of gas tanks of the German type installed, but certainly it is far above 500.

OTTO KAHRS,
Kristiania, Norway.

Good Results Obtained with No-Bypass Lubricating System

Editor, AUTOMOTIVE INDUSTRIES:

Referring to your editorial in the January 8th issue and the article of December 25th by Mr. Neil MacCoull, quite satisfactory results appear to be obtained with a method substantially the same as the one suggested.

In the system in mind, the oil is circulated freely through the crankshaft and out the ends through a fixed orifice which offers resistance in proportion to both speed and viscosity. As a consequence, the oil pressures increase with the speed, and upon starting with high oil viscosity the pressures generated on bearings are proportionately greater so that they receive sufficient oil for proper lubrication under these conditions.

In order to maintain the oil supply to connecting-rod bearings uniformly, and to eliminate the possibility of insufficient lubrication at some points where bearing clearances are increased, it is necessary that inherent control be established over this by proper discharge hole location so that increased clearances have little effect upon volume discharged.

A. A. BULL, Chief Engineer,
Northway Motor & Mfg. Co., Div. of General Motors Corp.

Annealing of Steel Castings Not Strictly a New Practice

Editor, AUTOMOTIVE INDUSTRIES:

Under date of Nov. 27, 1924, an article appeared on page 926 of your magazine headed "Five Steel Companies Using the Electric Method of Molding Agree to Anneal All Castings." In this article reference is made to a paper which was prepared by the writer for use of the Cleveland Section of the Steel Treaters' Society.

From the text of the article it is possible that an erroneous impression might be created in the minds of your readers. In the first place, reference is made to the Electric Steel Founders' Research Group in such a way that it appears that the group has been very recently organized. As a matter of fact, the activities of this group date from early in 1920 and a description of the cooperative research methods employed was given in your magazine under date of May 10, 1923, with the heading "Giving Away One Idea Brings Back Three or Four." For some years prior to the formation of the group all the member companies had produced only completely annealed products, and the new feature added to this through group activities was a complete standardization of annealing practice as a result of both laboratory and practical investigations carried forward by the writer at the plant of the Michigan Steel Casting Co.

In the past it has been common practice with some steel foundries producing a low grade product to deliver the same to their customers in the unannealed condition, with the result that the industry as a whole suffered in the estimation of well-informed engineers, due to the unreliability of unannealed castings. Annealing has been conscientiously practiced by up-to-date steel foundries for a great many years and this letter is written with the hope that it may correct any improper inferences in the minds of engineers as to the newness of the practice of annealing.

MICHIGAN STEEL CASTING CO.,
H. A. Neel, Gen. Mgr.

A NEW method of manufacturing gear blanks from its Celoron noiseless gear material has been devised by the Diamond State Fiber Co. of Bridgeport, Pa. Formerly the gear blanks were machined from solid plates in order to reduce the inner portion to the thickness of the web, but now they are molded in finished blank form, so that only the teeth need be cut. This, we understand, reduces the cost of the blanks materially.

EDITORIAL

Steam Cooling

DIFFICULTIES which stand in the way of adoption of evaporative cooling systems are commercial rather than technical, according to statements made by Alexander Taub of the General Motors Corp. during the recent S. A. E. meeting. That considerable study of systems of this character has been given in recent months by engineers of several prominent concerns in the industry is an open secret about which we are apt to hear a great deal more in the next few months.

We have been interested to note the pertinent comments concerning systems of this character made at the meeting mentioned above by engineers who have studied them in practical operation. Some of these comments are summarized below:

> Twelve thousand farm lighting plants made by Fairbanks-Morse and using evaporative cooling systems without pumps have been in successful use for several years.
>
> On some experimental steam-cooled cars no boiling away or loss of water occurs. One such car was driven from Los Angeles to Detroit and arrived with same water with which it started. Three hundred cars with steam-cooled engines and radiators in usual location have given no trouble in getting steam into radiator. No difficulty has been encountered in fitting steam cooling systems to existing cars.
>
> Greater turbulence occurs at hottest points in jacket and the heat is carried away more rapidly, in consequence of which there is a more nearly uniform temperature.

From the foregoing it appears that the possibilities of evaporative cooling have not escaped consideration.

Used Open Cars

IN the midst of all the talk about "the era of closed cars" it is well to remember that the open car already exists by the millions in the United States. While public desire for closed models has evidenced itself very strongly, the open car is going to be just as important a factor in car merchandising in the next two years as is the closed, not as a new car, but as a used one.

The great publicity given to the trend toward closed jobs is almost certain to have the effect of putting on the market an unusually large number of open models. Most people have a tendency to follow the general trend if for no other reason than that it is the general trend. Consequently, the emphasis being placed on closed cars will influence many people psychologically as well as physically to want the type most generally in demand.

The used car market, already in no very good condition, will be influenced unfavorably by the influx of any unusually large percentage of open models. Manufacturers will have to urge dealers very strongly to handle open car trade-ins on a sound basis, making allowances on a commercial rather than a purely mechanical basis. The problem does not offer any grave dangers, but it does call for special attention in the next few months.

The Automotive Merchant

A FEW years ago hardly a car manufacturer could be found who wanted his dealers to sell accessories and equipment. There was a general feeling that whatever capital the dealer had he needed to handle cars and that any money invested in accessory inventory reduced the number of cars he could take.

Today that attitude is changing. More vehicle builders have come to realize that a successful merchant, selling goods in all seasons and in all years, is a better dealer in the end than one dependent entirely on cars sales for his livelihood. With his profit curve more steady, the dealer can stay in business and help the car maker even when vehicle sales slump temporarily.

The sales manager of one of the most important car companies publicly has urged his dealers to take on accessory and equipment lines to fill out their merchandising picture. The president of the same organization approves the idea because, he says, "selling accessories keeps the dealer merchandising. It teaches him more about sales methods and keeps him on the job all the time."

The car dealer of the future must be an automotive merchant.

Bus Exhibits

THE motor bus came into its own in 1924. It is distinctly a product of the automotive industry, conceived, designed and promoted by the men who built up motor transportation.

It is a passenger carrying vehicle. Like the taxicab, it provides transportation for the individual when it isn't convenient for him to use his car and when he doesn't own a car. It is an integral part of the passenger carrying branch of the automobile business.

But up to the present time buses have been exhibited in large numbers only at shows which were tied up with the electric railway industry. The bus never has had a place set aside for it in the national automobile shows.

Many good arguments can be advanced, both from the standpoint of the bus manufacturers and from that of the public, for giving the motor bus a place alongside its brother transportation units—the passenger car and the taxicab. Exhibition of motor buses in future national shows is worth serious consideration.

Our Industry Today—

Production Is Going Forward at Quickened Pace—Early Optimism Vindicated by Increases in Output and Employment

NEW YORK, Feb. 16—Developments in the automotive industry are bearing out the optimistic predictions for 1925 made at the turn of the year. Production last month increased 8 per cent over that of December and it is going forward at an increased rate this month. In Detroit, the heart of the industry, industrial employment made a showing opposite to that made in the same week last year. This was a gain in employment of 235 in the same week that last year started the downward curve in this table. This is significant. If, as manufacturers predict, this curve will continue upward, production in the automotive industry will exceed that of last year, the second best year in automobile history. Those in close touch with developments are convinced that this will prove to be a fact.

Increases in manufacturing schedules continue to come forward. One manufacturer announces that his company's entire output has been sold up until the end of March. Another announces that by the opening of the spring season his plant capacity will have been increased by 40 per cent over the greatest production ever previously attained.

The leaders in the industry are going forward with extensions and with plans for operations on an increased scale. Reports coming in to them from all sections are favorable. Those that have not been quick in bringing their product up to present standards naturally will not fare so well, but, generally, prosperity prevails in the automotive field as well as in other lines of industry.

Standards Higher

Standards this year are higher than they ever have been. It has been revealed that the general move toward standardization has had its effect upon the public mind.

History very probably will show that 1925, with the inauguration of the low priced closed model, started a new epoch in automobile manufacturing and sales. The year started with stocks pretty well cleared and inventories low.

There very likely will be less profit per car, but sales on an increased scale. In truth, these sales already are developing. Reports from dealers are to the effect that buying is picking up everywhere.

With this as a basis, manufacturers are going ahead with increased plant operations and with more generally extended plans for the future.

G. M. JANUARY DELIVERIES

DETROIT, Feb. 18—Preliminary figures of General Motor Corp. for January show deliveries totaling 25,387 cars and trucks, compared with 33,574 in January, 1924. The company states figures are affected by the limited production of Chevrolet's new models.

Motor Wheel Shows Increased 1924 Net

President Says Output of First Half of 1925 Will Equal Same Period Last Year

DETROIT, Feb. 18—A net operating profit of $1,800,893 is shown by Motor Wheel Corp. for 1924, compared with $1,292,282 for the previous year. The surplus on hand is shown as $4,009,564. Current assets total $5,491,739, against $6,172,906 in 1923. Current liabilities total $1,084,443, as compared with $2,706,398 in 1923.

In his statement to stockholders H. F. Harper, president, said: "Orders and contracts on the books for the first six months of 1925 are very satisfactory. While production for the first three months will be less than for the same period last year, all indications are that the output for the first six months will equal that of the same period a year ago."

During 1924 bank loans amounting to $1,587,500 were retired. Purchases for sinking fund requirements have been made in the open market of $131,500 of bonds and $230,100 of preferred stock. The ratio of current assets to current liabilities is better than 5 to 1.

Income from the sale of products was $3,119,386, as compared to approximately $2,500,000 in 1923. Selling, advertising and general administrative expense was $734,212. Machinery sold and scrapped during the year and other miscellaneous losses totaled $5,278.

Westcott Gets $300,000 Rush Order

SPRINGFIELD, OHIO, Feb. 18—As a result of an order for 250 Westcott motor cars, totaling over $300,000, received from a new company being formed at Springfield, Mass., the Westcott Motor Car Co. is going to be rushed for the next 60 days at least. They will be distributed throughout the New England States. The business is to be handled by the Westcott Motor Co. of Springfield, Mass., being organized there by Green Bros. and the Westcott company's distributor at New Haven, Conn. Application has been made for a charter J. M. Rehe, secretary-treasurer, said.

Ford Wheel Plant Makes New Record

DETROIT, Feb. 18—Ford Motor Co.'s Hamilton, Ohio, wheel plant set a new high production mark Jan. 23 with a record of 13,347. Daily production now averages 12,000 wheels, 25 per cent above a year ago.

Motor Wheel Increases Dividend

LANSING, MICH., Feb. 18—Motor Wheel Corp. today increased its quarterly dividend on the common from 20 to 30 cents a share, payable March 20 to stock of record March 10. Stockholders adopted a resolution to cancel the 2500 preferred shares which have been purchased.

Motor Products Earns $13.14 a Share

NEW YORK, Feb. 18—Motor Products Corp. for the year ended Dec. 31, 1924, reports net profits after taxes of $1,024,233. The balance after preferred dividends was $821,438, or $13.14 a share on 62,500 shares of no par common stock outstanding.

Chevrolet to Increase Output

DETROIT, Feb. 18—Chevrolet Motor Car Co. has adopted a schedule of 40,000 cars for April to meet the demand for the new model. The company is shipping more than 1000 chassis a day. Not since 1923 has Chevrolet known any such demand.

Bendix Declares Initial on Class A Stock

SOUTH BEND, IND., Feb. 18—The Bendix Corp., which makes four wheel brakes with Bendix-Perrot controls, has declared an initial dividend of 50 cents a share on the Class A stock, payable April 1 to stock of record March 16.

Dodge Production Up

DETROIT, Feb. 18—As reported at the annual meeting here today, Dodge Brothers production in 1924 totaled 225,633 vehicles, valued at nearly $200,000,000, a gain of 25.5 per cent. Officers and directors were reelected.

SALES RECORDS BROKEN

TOLEDO, Feb. 17—January sales of batteries for automobile replacement and for radio are reported by the U. S. Light and Heat Corp. as 17 per cent above its best previous record, which was made in October, 1924. The company features USL storage batteries.

Balloon Tires Adopted by Ford for Cars

Now Supplied as Optional Equipment at a Slight Added Cost

DETROIT, Feb. 18—Balloon tires are now being furnished as optional equipment by the Ford Motor Co. on all models at an additional cost of $25 above the list with regular demountable rim and high pressure tires. On the runabout and touring models the extra charge for balloons as compared with regular clincher equipment is $45.

The complete price schedule is as follows:

WITHOUT STARTER

	Clincher rims and high pressure tires	Balloon equipment
Runabout	$260	$305
Touring	290	335

WITH STARTER

	Demountable rims and high pressure tires	Balloon equipment
Runabout	$345	$370
Touring	375	400
Coupe	520	545
Sedan Fordor	660	685
Sedan Tudor	580	605

Balloons furnished as equipment on Ford models will be of standard size, 29 x 4.40 straight side and mounted on wood wheels.

Cars carrying the new equipment are now being shipped from assembly branches. Dealers also have received stocks of new tires and wheels for changing over cars already on hand where buyers wish the balloon equipment.

To compensate for hard steering with balloon tires a special steering gear with a greater reduction is installed.

Ford Eliminates Banker in Selling Bond Issue

NEW YORK, Feb. 18—An innovation in financing was disclosed here when Henry Ford, the railroad owner, applied for permission to issue $1,181,000 Detroit, Toledo & Ironton Railroad 5 per cent bonds, which he proposed to sell to Henry Ford, the automobile manufacturer, at par. Thus he eliminated the middleman—the banking syndicate that usually underwrites new railroad issues.

The funds are to be used in the construction of 20 miles of railroad.

Motor Products Corp. Buys Parsons Company

DETROIT, Feb. 17—The Parsons Manufacturing Co. has been taken over by the Motor Products Corp. in an outright purchase. All manufacturing operations will be transferred at once to the plant of the purchasing company. Carl B. Parsons, president and general manager of the Parsons company, will become identified with the Motor Products Corp.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, Feb. 18—Industrial activity continues to gain more rapidly than trade. Conservatism among buyers is still very noticeable, and unfavorable weather has been a serious obstacle in many lines. Current reports indicate a considerably reduced scale of operations in the building industry. Last week commodity prices in general declined, and on Monday of this week the stock market experienced the most pronounced reaction since the election.

Unfilled orders reported by the United States Steel Corp. on Jan. 31 amounted to 5,037,323 tons, comparing with 4,816,676 tons at the end of December and 4,798,429 a year earlier. The month's gain of 220,647 tons was much smaller than the advance in December, but was larger than was generally expected in view of the slackening which had been reported in orders for steel.

Car loadings in the week ended Jan. 31 numbered 896,055, as against 924,254 in the preceding week and 929,623 in the corresponding period last year. The decline from the total for the week before and the failure to maintain the series of seasonal records reached in preceding weeks were attributed to stormy weather.

Production of crude petroleum in the week ended Feb. 7 averaged 1,941,600 barrels a day, comparing with a daily average of 1,953,300 barrels in the preceding week and 1,915,000 barrels in the corresponding period a year ago. The materially improved position of the industry, which has resulted from recent declines in output, is reflected in marked advances in prices of crude petroleum and gasoline.

Preliminary figures of foreign trade in January show exports of $447,000,000 and imports of $346,000,000, comparing with exports of $445,000,000 and imports of $334,000,000 in December, and exports of $395,000,000 and imports of $296,000,000 a year earlier.

Discounts by Federal Reserve banks increased $9,000,000 during the week ended Feb. 11, a decline of $17,000,000 in bills secured by government obligation being more than offset by a gain of $26,000,000 in "other bills discounted." The reserve ratio declined from 77.4 to 76.9 per cent.

Call loan rates were slightly higher last week, ranging from 3½ to 4½ per cent. Time loan and commercial paper rates were without change.

Swiss Maker Seeks to Invade U. S. Field

Negotiations Started by Brown-Bouveri Co. for Purchase of Two Companies

NEW YORK, Feb. 18—Negotiations have been started by the American subsidiary of the Brown-Bouveri Co., electrical manufacturer of Switzerland, which makes the Scintilla magneto, for the acquisition of the Wagner Electrical Corp. of St. Louis, which has been manufacturing electrical equipment for automobiles for many years. Recently the latter company has been engaged in the manufacture of four wheel brakes.

It is stated that the Brown-Bouveri company, represented by Laurence Wilder, who recently announced plans for the Swiss company's invasion of the American electrical market, is also negotiating for the purchase of the William Cramp & Sons Ship & Engine Building Co. of Philadelphia, a subsidiary of the American Ship & Commerce Corp., controlled by W. A. Harriman.

J. Herndom Smith, a director of the Wagner company, is in New York conducting the negotiations. W. A. Wayman, president of the Wagner company, has notified stockholders of the offer by the Swiss interests.

It is reported that the Brown-Bouveri company's American subsidiary shortly will bring out a $20,000,000 bond issue, ostensibly for the purpose of acquiring the properties.

Eastman Kodak to Market New Automobile Paint

ROCHESTER, N. Y., Feb. 18—Laboratory experts of the Eastman Kodak Co. are now working on a paint of unusual lustre and durability which, it is understood, will be marketed as a finish for automobiles and furniture under the trade name of "Kodalak." The paint, it is claimed, is superior to anything in this line and is expected to revolutionize the business of automobile and furniture finishing.

Kodalak is based principally on nitrate of cotton, one of the chief ingredients in the manufacture of film. The paint, it is claimed, will dry in 30 minutes and requires a minimum of rubbing.

Oakland Produces New Special Sedan Car

DETROIT, Feb. 18—Oakland Motor Car Co. is now in production on a new special sedan, mounted on the regular Oakland chassis, priced at $1,375, f.o.b. Pontiac.

The car is a standard four door, five-passenger model, with Fisher built body. The coloring is in sagebrush Duco, the body, hood and wheels with orange striping. The wheels are artillery type, with 30 x 4.95 balloon tires.

Automobile Men Go to Rate Hearings

Commerce Commission to Start Far-reaching Investigation on Pacific Coast

DETROIT, Feb. 18—Following a meeting of the traffic managers, members of the National Automobile Chamber of Commerce, here, it was announced that the industry would be represented at the Interstate Commerce Commission hearing in San Francisco Feb. 26 by J. S. Marvin, N. A. C. C.; W. J. Bailey, Durant Motors; E. J. Klebba, Ford, and possibly others.

The case before the commission involves freight rates on finished automobiles and trucks, as well as automobile parts, and shipments for export via Pacific Coast ports. It is thought this investigation will be one of the most far-reaching ever undertaken by the commission.

Freight rates on plate glass, automomobile lamps, radiator caps, heaters, carpets and body panels were under discussion, and reports were made on hearings before railroad committees.

Proposed readjustment of class rates from Indiana to St. Paul and other points in that vicinity seem to indicate some disadvantage to Michigan and Ohio shippers, and it was decided to attend meetings which will shortly be held to adjust these rates.

Mexican railroads have announced a reduction in the minimum carload weight charged on automobiles from 22,046 lb. to 19,400 lb. on 36-ft. cars; from 24,692 lb. to 22,046 on 40-ft. cars, and from 31,305 lb. to 22,046 lb. on 50-ft. cars. This has been the subject of negotiation for a long time between the traffic men of the industry and the Mexican railroad officers.

Represented at the meeting were American - LaFrance, Buick, Cadillac, Chevrolet, Dodge, Durant, Flint, Garford, General Motors, Hupp, Lincoln, Maxwell, Oakland, Olds, Packard, Paige-Detroit, Pierce-Arrow, Rollin, Studebaker, White; W. E. Metzger, K. A. Moore, N. A. C. C., and J. S. Marvin, chairman of the conference.

F. E. Partridge Heads Canadian Rubber Body

MONTREAL, Feb. 18—At the annual meeting of the Rubber Association of Canada here, F. E. Partridge, president of the F. E. Partridge Rubber Co. of Guelph, Ont., was elected president; J. A. Hathaway, vice-president; John Western, treasurer; Joseph O'Mara, assistant treasurer, and A. B. Hanney, manager and secretary.

Directors were chosen as follows: C. N. Candee, Gutta Percha & Rubber, Ltd., Toronto; C. H. Carlisle, Goodyear Tire & Rubber Co., Ltd., Toronto; W. A. Eden, Canadian Consolidated Rubber Co., Ltd., Montreal; W. H. Miner, Miner Rubber Co., Ltd., Montreal; F. E. Partridge, F. E. Partridge Rubber Co., Ltd., Guelph, Ont.; J. Western, Dunlop Tire & Rubber Goods Co., Toronto; W. B. Wiegand, Ames-Holden Tire & Rubber Co., Kitchener; J. D. Hathaway, Northern Electric Co., Ltd., Montreal; H. E. BeSaw, Firestone Tire & Rubber Co., Hamilton, Ont.; Joseph O'Mara, K. S. Tire & Rubber Goods Co., Ltd., Toronto, and F. L. Freudemann, Sterling Rubber Co., Guelph, Ont.

New Mayfair Automobile Brought Out at Boston

BOSTON, Feb. 18—With the opening of salesrooms on Commonwealth Avenue at Kenmore Station and securing space at the Boston Automobile Show, the Mayfair Automobile Co. is ready to make its debut in the motor industry. The company was formed recently, although it has been under consideration for a long time. Arthur Lincoln is one of its prime movers.

The company is now building its models at Jamaica Plain, and it lists the five-passenger sedan for $485 delivered at Boston. No specifications have been given out as yet, but the car is known to be a four-cylinder one with selective gear transmission. The car is to be known as the Mayfair.

Employment Gains Shown in Detroit and Toledo

DETROIT, Feb. 18—An increase of 235 in Detroit industrial employment is shown in the last weekly report of the Detroit Employers Association. The total is 207,107, compared with 241,402 a year ago.

Figures at this time as to employment are given close attention, for the corresponding week in 1924 marked the beginning of a decline from the high mark of 242,331, which was reached the week ended Feb. 2, 1924.

Employment Increases at Toledo Plants

TOLEDO, Feb. 18—Fifty-one Toledo industrial companies reported to the Merchants and Manufacturers Association that they added 760 persons to their payrolls in the week ended Thursday. Employees at the plants now total 22,816, compared with 27,919 in the corresponding week of 1924.

STEWART-WARNER'S RADIO

CHICAGO, Feb. 18—Announcement is made that the first radio set to be placed on the market by the Stewart-Warner Speedometer Corp. will sell at $125, without equipment. A lower priced model will be added. There also will be some deluxe models after production is obtained on the first set. The company will not begin to make shipments until March 1. It is said the company plans the acquisition of an eastern company manufacturing radio parts. Assembly work would be done at the Diversey Parkway factory.

Ver Linden Is Chosen to Head Peerless

New Executive Succeeds D. A. Burke—Merger Negotiations Are Continued

CLEVELAND, Feb. 18—Ed. Ver Linden, president and general manager of the Olds Motor Works, will be the new president of the Peerless Motor Car Co. of Cleveland, succeeding D. A. Burke, who has resigned.

Mr. Ver Linden, the new president, is credited as being one of the principal factors in building up the business of the Buick Motor Co. in the early days when he served as manager of production. In 1912 he was appointed president and general manager of the Olds Motor Works. He remained until 1921.

After severing his connection with General Motors Mr. Ver Linden was with Durant for a short time. He built the large Durant plant in Lansing, Mich.

Mr. Burke took full charge of Peerless in December a year ago. He had been head of the company for several months following the resignation of R. H. Collins as president. When Mr. Burke assumed the management of Peerless it was with the understanding that somebody else would be found later to take his place.

The Peerless directors announced that they accepted the resignation with regret. Mr. Burke said he was "leaving the Peerless Motor Car Co. with the most friendly feeling and with the prediction that the plans for the immediate future spell remarkable success for Peerless during 1925 and succeeding years."

For a period of months negotiations have been under way with Rickenbacker, Gray and the Rippensee Body Co. Conferences have been held in New York this month. It is understood Mr. Ver-Linden will continue these negotiations.

U. S. and Poland Agree to Lower Vehicle Duties

WASHINGTON, Feb. 18—A reduction of 40 per cent for automobiles and motorcycles of American origin below the general duties has just been effected in a temporary trade agreement between the United States and Poland, it has been announced by the Bureau of Foreign and Domestic Commerce. While the agreement is subject to ratification by the Polish Diet, it comes provisionally into effect at once.

By virtue of this agreement the handicaps upon the importation of certain American products into Poland, because of the lower duties conceded by Poland in special treaties with other countries, are removed. American products are now paying as favorable duties as those from any other country in return for similar treatment of Polish products in the United States.

New York Considers Traffic Relief Plans

Vehicular Tunnels and Elimination of Downtown Street Cars Suggested

NEW YORK, Feb. 18—At its first public hearing at City Hall here the Advisory Committee on Traffic Relief, appointed by the Board of Estimate to prepare a constructive traffic program for New York City, received many suggested solutions.

In commenting upon a suggestion of W. W. Arnheim, representing the Broadway Association, that taxicab stands be established on all one-way streets in midtown to reduce cruising, John Ullman, secretary of the Empire State Chamber of Commerce, said that if property owners were unselfish enough to permit such stands 90 per cent of the cruising would be eradicated. Mr. Ullman suggests the removal of all street cars below Fifty-ninth Street in favor of buses.

Michael Donnella of the Taxicab Chamber proposed that trucking be done at night. He also recommended a vehicular tunnel from one end of the city to the other, open at the top, to save the expense of a gas-freeing system. He suggested that every automobile owner be taxed $5 or $10 for the tunnel fund.

Theodore D. Pratt, general manager of the Motor Truck Association of America, urged the carrying out of Borough President Julius Miller's plan for arcading streets and the use of double deck buses in place of street cars.

Isaac Goldberg, representing the Merchant Truckmen's Bureau, challenged a statement of E. W. Estes about a $1,000,000 daily loss through traffic congestion and added that if any loss is sustained it is borne by the carriers, not by the public.

Another recommended was the erection of double deck highways surrounding the island below Seventy-second street.

A. E. A. Board Plans Meeting at Hot Springs

CHICAGO, Feb. 18—Future activities of the Automotive Equipment Association include a meeting of a board of directors and membership committee at Hot Springs, Ark., April 6 and 7. Following this meeting the board of governors will make a tour of several southern States including Oklahoma, Texas, Arkansas and Louisiana.

Another A. E. A. event is to be a dinner and meeting for dealers in Charleston, W. Va., on the evening of Feb. 27 under the auspices of the Motor Car Supply Co. of that city. The profitable maintenance film of the A. E. A. will be exhibited.

The profitable maintenance film will also be a feature of a meeting of dealers to be held at Watertown, S. D., March 6, under the auspices of the Watertown Motor Accessories Co., in connection with the Watertown Automobile Show.

Another meeting of dealers was held at Mineral Point, Wis., Feb. 10, under the auspices of the Mid-West Auto Supply Co. of Dubuque, Iowa. The profitable maintenance and shop profits film were shown at this meeting.

A. E. A. in Northwest Holds Many Meetings

CHICAGO, Feb. 18—A number of very successful State meetings of Automotive Equipment Association members in the Northwest were reported by Arthur R. Mogge, merchandising director of the A. E. A., upon his return from an extensive tour of the Pacific coast.

At a meeting in San Francisco attended by 23 representatives of A. E. A. members, a movement was started to organize a special train from the Pacific Coast to the A. E. A. summer meeting in June at Colorado Springs.

Oregon members met at Portland and decided to hold a later meeting to consider plans for showing the "Profitable Maintenance" film in that State.

Washington members met at Seattle and found the occasion so profitable that hereafter they will hold monthly meetings.

Another meeting attended by Mr. Mogge before his return to Chicago was that of 17 Minnesota members of the A. E. A. at St. Paul. An important subject discussed at this meeting was "returned goods."

Sees Highways Affecting Future Car Designs

NEW YORK, Feb. 18—The nation-wide drive for greater safety on our streets and highways will have an increasing effect upon future designs of motor cars, according to William R. Strickland, assistant chief engineer of the Cadillac Motor Car Co., who also declares it is already influencing buyers of new models.

"While the personal equation is still the greatest factor in safe driving," said Mr. Strickland, "many features of car design have a very definite relation to safe operation." He added:

> The greatest single feature is brakes. With the increase in the number of cars in operation and the added fact that the individual car is driven many more miles per year than was the car formerly, resultant highway congestion made an undeniable demand for four-wheel brakes.

ISSUE 100,000 LICENSES

LOS ANGELES, Feb. 17—More than 100,000 motor vehicle licenses were issued here during the first week of February. The State law provides that all licenses must be renewed by March 1. Approximately 1,300,000 licenses will be issued. The license plates are being distributed by the State through its offices at Sacramento, San Francisco and Los Angeles.

Federal Truck Sales Gain 651 in 1924

Introduction of New Vehicle Will Add to 1925 Business, Company Reports

DETROIT, Feb. 18—Sales by the Federal Motor Truck Co. during the year ended Dec. 31, 1924, totaled $7,339,367, a decrease from the former year of $150,507. Sales of vehicles for the year were 4216, an increase of 651. Net profit for the year was $684,670, a decrease from 1923 of $417,460. Net earnings after charges, but before taxes, were equal to $3.42 a share ($10 par) on the 200,000 shares, compared with $5.51 a share in 1923.

Reduction of the gross sales in dollars, as compared to an increase in the number of vehicles sold, is attributed by the company to the sale of a greater number of smaller trucks. The reduction in net profit is ascribed to the charging off of developing, advertising and marketing of the new Federal Knight as expense against last year's business. This expenditure will be reflected in increased business during the present year, the company states.

This new truck is now introduced on a world-wide basis, the company declares, and both foreign and domestic orders are being received in volume. Over 500 sales agencies have been added to the company's distributing organization through this new truck. Its success has prompted the company to add a new Knight motored vehicle in a larger size. This will be ready for introduction in July. Thirteen factory branches are now in operation, and it is the company's plan to increase this number to 20 during 1925.

Production scheduled for the year is approximately 8000, almost double that of last year. This increase will be brought about without addition to equipment or organization.

Five Companies Asked to Build Mail Planes

WASHINGTON, Feb. 17—Five airplane construction companies have been selected by the Post Office Department to build a new type of airplane to replace the present De Haviland mail planes which were turned over to it by the War Department. The present war stock of rebuilt planes is about exhausted, and from the performance of the five new planes the department is expected to select one as standard for postal use.

The companies which are to compete on the new specifications are: Curtiss, Douglas, Huff-Daland, Boeing and Elias.

Each company will design its craft in accordance with specifications demanded by the department as follows: Cruising speed of 100 miles an hour, service ceiling of 15,000 ft., landing speed of 50 miles an hour and ability to carry 1000 lb. of mail in addition to the pilot.

Men of the Industry and What They Are Doing

Laporte Succeeds Huntley

L. Alphonse Laporte has been appointed general manager and treasurer of the New England Tire & Rubber Co., succeeding C. S. Huntley. Mr. Laporte joined the company more than a year ago as sales manager. Officers elected at the annual meeting are: President, A. T. Hopkins; vice-president, John Kearns, and directors, Horace E. Hildreth, Thomas Eaton, Joseph F. Ranger, Nathan P. Avery and L. Alphonse Laporte.

Anderson Advanced by Fisk

J. D. Anderson, vice-president and factory manager of the Fisk division of the Fisk Rubber Co. at Chicopee Falls, Mass., has been made vice-president in charge of production at all divisions of the company.

Goodrich Returns to Pratt & Whitney

C. L. Goodrich has been made assistant to the general manager of the Pratt & Whitney Co., Hartford, Conn. He assumes this position after having served as acting general manager of the Bement Works in Philadelphia for some time. In a previous association with the Pratt & Whitney Co., Mr. Goodrich was in charge of the manufacture of many of the large arsenals which the company installed throughout the world.

Foy Resigns from Reo

Byron C. Foy, president of the Reo Motor Car Co. of California, has resigned. Mr. Foy has been at the head of Reo activities in this State for about four years, during which time the organization has grown and prospered. Recently he married a daughter of Walter Chrysler, the motor car manufacturer. Mr. Foy states that he has not determined his future definitely, but expects to remain in the automobile business.

Louden Goes with Dayton Company

W. P. Loudon, formerly chief engineer of the automotive section of the Westinghouse Electric & Manufacturing Co., has assumed the position of assistant chief engineer of the Dayton Engineering Laboratories Co. Mr. Louden is widely known in his field, having begun with General Electric, of whose school he is a graduate. Later he was connected with the United States Light and Heat Corp. During the war he was one of the heads of the aircraft accounting division.

Lytton Made Factory Representative

J. W. Lytton has been appointed special factory representative of the Swartwout Co., Cleveland, manufacturers of steam specialties.

Daly Resumes Standard Position

Edwin F. Daly, for the last 21 years one of the pioneers in the automobile bearing industry, has returned after a year's absence to his former position of New York manager of the Standard Sales & Service Co. of Plainfield, Conn., distributor of S. R. B. and Gurney ball bearings, with headquarters at 1926 Broadway.

Montgomery on A. A. A. Staff

A. J. Montgomery, well known Washington newspaper man, has been added to the editorial and public information staff of the American Automobile Association. Mr. Montgomery will also engage in research work in behalf of the enlarged activities of the A. A. A. since its consolidation with the N. M. A.

Cruikshank Succeeds Hope

Alex G. Cruikshank, who has been manager of the District of Columbia division of the American Automobile Association during the last two years, has been appointed assistant general manager of the American Automobile Association. Mr. Cruikshank succeeds John R. Hope, who has gone to Richmond to take charge of the automobile club in that city.

Kalmes Succeeds Bell

Joseph Kalmes, superintendent of the Menominee Truck Co. at Clintonville, Wis., has been appointed general manager to fill the vacancy caused by the resignation of James A. Bell. The company is owned by the same interests as the F W D Auto Co. of Clintonville, of which Walter A. Olen is president and general manager.

Kinstler Elected Vice President

At the annual meeting of the Van Wheel Corp., Oneida, N. Y., L. L. Kinstler, who has been sales manager, was elected vice-president of the company. R. T. Wennstroem continues as treasurer and general manager.

Ryan Becomes Central Official

Ellis W. Ryan has been made chairman of the board of Ryan Sales Engineering Co., Detroit, and also vice-president and general manager of the Central Manufacturing Co. of Connersville, Ind., one of the largest body building plants in that State. N. C. Foss, formerly secretary and treasurer, will succeed Mr. Ryan as president of the Ryan sales Co., and while Mr. Ryan retains his interest in the company which bears his name, his time will be released for the general management of the body plant.

F. LINDSCOTT DEAD

BOSTON, Feb. 17—Fred Lindscott, a prominent jobber, died here.

Electric Men Define Bus As Auxiliary

Washington Conference Agrees on Vehicles as Aid in Local Transportation

WASHINGTON, Feb. 18—The place of the bus has been defined as an auxiliary in local transportation. The decision was an outgrowth of the adoption by the American Electric Railway Association of an agreement reached by representatives of automotive and traction organizations, at their fifteenth annual mid-year conference here.

In making this decision, it was agreed that no medium has been developed which can supplant electric railways in moving large urban crowds in rush hours. It was also held that electric railway companies should provide both bus and electric car service essential to good public service, with protection against competition when doing so.

The agreement stated that buses should be regulated as common carriers, and that both buses and electric railroads should bear proportionate taxes.

The American Automobile Chamber of Commerce and the American Automobile Association joined in drawing the agreement, and T. R. Dahl of Cleveland represented the automotive interests in its consideration.

Growth of Bus Noted

Mr. Dahl declared himself against the financing of independent bus companies by manufacturers to encourage competition with electric railways which deal with them.

"What is important," he said, "is showing the growth of the use of the bus by electric railways, in that since October, 1923, the number of buses used by electric railways increased 229 per cent. The number of railways using buses increased 70 per cent and the miles of route increased 270 per cent."

In his address J. N. Shannahan, president of the American Electric Railway Association, declared: "Delayed in front by traffic congestion and threatened behind by reckless motor car drivers, it is high time the 43,000,000 daily street car and bus riders of the nation battled for their rights.

BANTA GOES WITH G. M. T.

DETROIT, Feb. 18—A. J. Banta, well known sales executive in the passenger car and truck fields, has been appointed assistant to Otto E. Stoll, general manager of the General Motors Truck Co. He will have complete charge of engineering, manufacturing and purchasing. Mr. Banta formerly was sales manager of the Rickenbacker Motor Car Co.

Kansas City Show is Swept by Fire

All Exhibits Either Destroyed or Damaged—Loss Placed at $1,074,000

KANSAS CITY, MO., Feb. 18—On the morning of the day (Saturday) on which it was to close, the nineteenth annual automobile show here was swept by a fire which caused $1,074,000 damage to the exhibits and to the Royal Livestock Pavilion and annex, in which it was held. The loss is mostly covered by insurance.

It was the most disastrous conflagration in the history of automobile shows. The exhibition was held under the auspices of the Kansas City Motor Car Dealers Association.

Approximately 225 passenger cars on display, 15 chassis, many cutaway motors, 75 motor trucks, two airplanes, a dozen motor buses and a large assortment of accessories were either totally destroyed or badly damaged by flames and water.

Many of the cars on display had been shown at this year's New York, Cleveland and Chicago shows and were intended for the San Francisco exhibit. Only two cars were saved. These were Studebakers driven out by firemen soon after they gained access to the flaming buildings.

Some of the dealers are adequately protected by insurance, which each handled separately. In some cases the exhibits were owned by manufacturers and were sent here for the show. It is said that few dealers had full coverage on their cars, trucks or accessories.

The dealers who were protected on the property in the show building were those who had secured special contract for the transfer of the coverage on the goods moved to the show building. It is said that many of the dealers had made this insurance arrangement.

Cars Fall From Wooden Balcony

The fire started a few moments after midnight. The last of the thousands of people who attended the exhibit Friday night had been ushered from the building only an hour before the flames were discovered in the accessory section, an annex of steel and concrete attached to the main arena floor building. This section was on the second floor of the annex on the same level with the main display in the arena building.

Blasts rocked the structure as the flames reached the gasoline tanks of the vehicles. A wooden balcony in the main building upon which many high priced cars were exhibited hastened the spread of the fire. This soon weakened and gave way. These cars plunged down upon others in the arena. The debris greatly impaired the fire fighting.

Virtually all apparatus in the two cities was rushed to the scene, but the efforts of the firemen were unavailing. Within less than two hours the pavilion walls had crumpled and the roof of the main structure had caved in. Capt. John J. Crane, the oldest fireman in Kansas City, was crushed to death.

Five nickel-plated chassis, constructed for show purposes and valued at $20,000 each, were demolished. A safe belonging to the dealers' association and which contained $42,000 was removed.

Faulty wiring is ascribed as the cause of the fire.

The pavilion, which was owned by the American Royal Livestock Association, was dedicated Nov. 18, 1922, and was considered the finest of its kind in the country. It was said to have been fireproof. The floor area was seven and one-half acres, and the auditorium had a seating capacity of 14,000.

Total attendance at the show was about 150,000.

$150,000 Garage Fire at Marion

MARION, OHIO, Feb. 18—Fire of unknown origin totally destroyed the Buick Garage here, causing a loss of $150,000. Among the cars destroyed was the $15,000 automobile formerly belonging to the late Mrs. Warren G. Harding. In all 150 automobiles were damaged.

UNITED TIRE PLANT SOLD

POTTSTOWN, PA., Feb. 18—As a result of equity proceedings started by the William N. Albee Co., the plant and equipment of the Hydro United Tire Co. were sold separately here by an auctioneer for a total of $60,000. The highest bid for the property in bulk was $160,000. Samuel Freeman, the auctioneer, stated he did not believe the court would confirm the sale, "as the plant is worth fully $2,000,000."

New Company Formed to Make Airplanes

Lawrence D. Buhl Heads Organization to Enter Military and Commercial Fields

DETROIT, Feb. 18—The Buhl-Verville Airplane Co. is being formed here to develop high speed pursuit airplanes for military pursuit as its primary purpose. Its aim also is to keep abreast of commercial aviation with a view to entering this field later.

Lawrence D. Buhl, president of the Buhl Stamping Co., is to head the new company, with Alfred V. Verville, internationally known designer, as vice-president and chief engineer. Other officers will be Neil C. McMath, now general manager of the Canadian plant of the Buhl Stamping Co., as first vice-president and general manager; H. P. Smith, secretary and general manager of Buhl Stamping, secretary and treasurer. Arthur H. Buhl will be a director of the new company.

Headquarters of the company will be in part of the Buhl Stamping plant in this city.

Mr. Verville has been a leader in airplane development work for many years. In 1914, while with the Curtiss company, he developed and built several innovations. During the war he designed and built a number of improved type of fighting planes. He followed this by building several racing planes, winners in the Pulitzer races of 1920 and 1924. He will proceed with the designing of a new high speed plane, which is expected to exceed all former types in manoeuvering ability and in value to military air forces.

Kansas City Show After the Fire

Above is a view of the main building, American Royal Pavilion, after the Kansas City automobile show fire. The twisted steel is the wreckage of the fallen roof. At the right is the wall between the arena building and annex. On the concrete seat ledges are remnants of motor cars fallen from the wooden platforms or balconies that had been erected above

U.S. Airplane Exports Are Doubled in 1924

Value $364,715 More Than in 1923 with Mexico Leading as Market

WASHINGTON, Feb. 18 — Although still comprising a very small portion of the total shipments of automotive products from the United States, aircraft exports in 1924 were almost double those of 1923.

The value of 1924 aircraft exports was $798,275, or $364,715 more than in 1923, and the number of airplanes and seaplanes exported exceeded those of the previous year by 10.

The year 1920 still stands as the record-maker in shipment of planes, but 1924 approached it more closely than any other year. Since the beginning of 1922 there has been a steady increase in the number of planes exported, as well as in the total value of all aircraft products. There is every indication, according to the Automotive Division of the Commerce Department, that this increase will continue.

The promising showing made in aircraft export trade last year, however, falls into its true position in the picture of automotive exports when compared with the gross total for the year. Exports of all automotive products in 1924 were valued at $220,900,808, and of this total sum aircraft shipments made up but 0.0036 per cent.

Mexico Leads in Market

Latin American countries absorbed over 60 per cent of the total value of 1924 aircraft exports. Mexico leads as the market for planes, as it did during the year 1922, when it received 22 planes valued at $19,600. In 1923 Mexico surrendered first place to Brazil, having taken only 4 planes valued at $5,700, as compared with the 13 valued at $229,200, which Brazil took during that year.

The quantity of engines exported to the Netherlands is significant, numbering 58, with an average value of $1,158, while the 27 sent to Russia have an average value of only $300.

This difference is probably accounted for by the fact that the Netherlands is a market for up-to-date high-powered engines for use in planes of their own manufacture, while Russia is buying cheaper engines adaptable for other uses than aircraft power plants.

An indication of Japan's growing interest in aviation is shown by the fact that it received parts for aircraft second only to Mexico in both weight and value.

PRODUCES NEW CARBURETOR

PEORIA, ILL., Feb. 17—The Auxiliary Manufacturing Corp. of this place is producing an "auxiliary carburetor" fitted to all makes of engines, which is said to reduce many of the motor troubles. The new carburetor is said to prevent the introduction of diluted lubrication oil through the carburetor into the motor, past the piston rings and into the crankcase. Tests have been completed here under the supervision of Dr. G. C. Ashman, director of the testing laboratories of the Bradley Polytechnic Institute.

Caution Filling Stations on Discharge Devices

WASHINGTON, Feb. 18—Caution notices are being sent out here by the National Fire Protection Association against the careless use by filling stations of "visible measure" gasoline discharge devices by the leaving off of the metal screens designed to protect the glass cylinder from breakage. It is said difficulty in keeping the glass surfaces clean induces the removal of the meshed metal protector.

It is pointed out by the association that a strict surveillance over these devices should be kept by fire authorities, as with the glass container unprotected the serious hazard which originally gave the visible measure device its bad name prevails and has led to its exclusion from certain cities and States.

Truck License Fees Increased in Ontario

TORONTO, ONT., Feb. 16—Increases in truck license fees ranging from $2 to $47 have just been instituted by the Province of Ontario, Canada.

Pneumatic tired trucks whose gross weight is less than two tons now will be taxed $16 instead of $14 as previously. Solid tired trucks of gross weight under two tons will be taxed $18, instead of $14.

Heavy commercial vehicles will bear the chief burden of the tax increases. Trucks whose gross weight is over 11 and under 12 tons now will be taxed $144 when equipped with pneumatic tires and $168 when equipped with solid tires instead of $121, the former tax for all vehicles of this weight regardless of tire equipment.

A. A. A. Visualizes Future of Organized Motordom

WASHINGTON, Feb. 18—Visualizing the status of American motoring when there are 5,000,000 organized car owners instead of 1,000,000, the American Automobile Association is formulating plans for the future, along with plans already under way for present and near future use, according to a bulletin issued this week at the organization's headquarters in this city.

In the bulletin Thomas P. Henry, president of the A. A. A., declares that, while the men in the field of car-owner organization must keep both feet on the ground in order to grapple with the many perplexing problems in motordom today, it is vitally necessary to plan for the momentous future.

Rubber Companies Show Gain in 1924

General Increases in Working Capital Appear in Annual Reports

AKRON, Feb. 18—Not only have sales and earnings of the majority of rubber companies shown a marked increase during 1924, but their position has been materially strengthened, as shown by substantial gains in working capital.

The B. F. Goodrich Co. preliminary report showed that on Dec. 31, 1924, it had $40,600,000 of working capital, an increase of $6,000,000 for the year. Goodyear showed $52,861,575, which was a gain of $3,889,493. Firestone reported working capital of $25,800,000, a gain of $8,000,000 over 1923.

Goodrich net profits increased about 190 per cent, although sales were only 2 per cent greater than in 1923. Goodyear showed an increase in sales of about 8 per cent, while the net profits were 55 per cent higher. Goodrich earned $10.50 net on common stock, and Goodyear $7.78, after all charges.

Some of the smaller companies have shown even larger gains in sales and earnings, according to annual statements issued this week.

Mohawk 1924 Sales $3,413,731

Sales of the Mohawk Rubber Co. during 1924 were $3,413,731, an increase of $1,117,266, or 48.6 per cent over 1923, according to the announcement of President S. S. Miller. As compared with no profit in 1923, the company earned $343,656 last year, the annual statement shows. After deducting preferred dividends, the balance is equivalent to $10.18 on the common stock.

Mohawk's daily output of tires increased from 375 in 1923 to 780 in 1924, and new additions recently made to the plant now give the company a capacity of 1200 tires a day, which officials say will be increased to 1400 a day this year. The total number of tires made by the company in 1923 was 103,179 compared with 214,629 in 1924, an increase of 108 per cent.

The following officers were elected for the ensuing year: S. S. Miller, president; Francis Seiberling, vice-president; H. H. McCloskey, secretary; R. E. Bloch, treasurer; H. H. Matz, assistant treasurer, and J. F. Jones, sales manager.

Falls Rubber 1924 Sales Gain

President M. J. O'Donnell of the Falls Rubber Co. reported sales of approximately $2,754,631 in 1924, representing a gain of 54 per cent over 1923. Net profit was reported satisfactory.

Officers elected were: M. J. O'Donnell, president; C. F. Bailey, vice-president; J. O. King, vice-president; G. D. Kratz, vice-president; O. C. Nelson, secretary, and W. P. Cline, assistant secretary and treasurer.

Commission Creates World's Championship

Contest Will Be Open to All Nations—European Racing News

PARIS, Feb. 10 (*by mail*)—On the initiative of the Italian Automobile Club, the World's Championship was established here at a meeting of the International Sporting Commission, and will be open to all nations represented in the International Association of Recognized Automobile Clubs.

The championship, which comprises a cash prize of 70,000 francs and an object of art valued at 30,000 francs, will be accorded to the driver having secured the highest number of points in the Italian Grand Prix and in two of the following races selected by him: Indianapolis, European Grand Prix, French Grand Prix. All these races are for 122 cu. in. cars.

The basis of awards will be one point for first place, two for second and three for third. All other positions equal four points. Five points will be given for non-starting.

The driver with the lowest number of points at the end of the season secures the championship.

Lists for Touring Grand Prix

PARIS, Feb. 10 (*by mail*) — Twenty-one cars figured on the lists for the French Touring Grand Prix, to be held on July 19, and which figures as the most important event of the year for other than racing cars.

In the 305 cu. in. six-passenger class the Austrian Steyr is the only competitor, with three cars. Cottin-Desgouttes is alone in the 183 cu. in. six-passenger class, while in the 91½ cu. in. two-passenger division the competitors are Buggati (5), Mathis (3), E. H. P. (2), Darracq (3) and Diatto (2).

European Rules for 1926

PARIS, Feb. 10 (*by mail*)—European racing rules for 1926 provide for a maximum piston displacement of 1500 cc., (91½ cu. in.), the use of superchargers, a minimum weight empty of 1322 lb., single-seater bodies with a minimum cross section the area of which will be decided on after experiments have been carried out on Brooklands and Monza track. These decisions were taken at a meeting of the International Sporting Commission, uniting delegates from France, Italy, England Belgium, Austria and the Automobile Club of America.

17 Entered for French Grand Prix

PARIS, Feb. 10 (*by mail*)—Seventeen cars are entered for the French Grand Prix 122 cu. in. race, to be run on the Montlhery track and circuit, near Paris, on July 26. The firms entered are Bugatti, five cars; Delage, four cars; Alfa-Romeo, three cars; Sunbeam, three cars, and Mathis and Thomas Special, one each. Entries at double fees, 10,000 francs per car, are received until March 20 and, according to the organizers, some American drivers will take advantage of this.

Some surprise has been expressed at the abstention of Fiat. The Italian firm has decided, however, not to race this year, but has already started work on a set of 91½ cu. in. cars, which probably will be tried out in the Italian Grand Prix, at Monza, next September.

Baker in Rickenbacker Establishes New Record

LOS ANGELES, Feb. 18—"Cannon Ball" Baker in the new Rickenbacker Six completed his New York to Los Angeles run by breaking all automobile and train records between the Atlantic and Pacific coasts. The trip was made in 71 hr. and 33 min., which is 15 hr. and 2 min. faster than that made by the swiftest train. The average speed for the 3,106.5 miles was 43.4.

The weights of the car, passengers and baggage totaled 4660 lb. Every unit of the car was in perfect mechanical condition at the finish, with the original set of balloon tires still in place. The total mileage of the car and tires to date aggregates 6207.

That Baker's confidence in the four-wheel brakes was justified, according to the Rickenbacker company, was amply proven by the fact that he must have saved seconds and fractions of seconds many thousands of times en route to beat the former automobile and railroad records by such a wide margin.

International Body Bars Company and Two Racers

PARIS, Feb. 10 (*by mail*)—By a decision of the International Sporting Commission, the Diatto Automobile Co. of Turin, Italy, has been suspended from racing for five years; Luis Mora, a Spanish dealer, has been disqualified for the same length of time, and the license of Alfieri Maserati, the race driver, has been withdrawn for two years. The charge brought against these persons was that they had run in a 122 cu. in. race with a 183 cu. in. engine.

The Diatto Automobile Co. announces that it will protest the decision on the ground that the entry was made by the dealer and the driver without its knowledge or consent.

Aeronautics Commission Provided in New Bill

WASHINGTON, Feb. 17—A commission on aeronautics, to be known as the Federal Aeronautics Commission, is provided in a bill introduced by Senator King of Utah. An appropriation of $100,000 is provided to meet its expenses to July 1, 1926.

The commission is to consist of the secretaries of War and Navy, the Postmaster General and one civilian.

Myers Gets Entries for Indianapolis Race

American Finds Europeans Are Building for the 1926 Campaign

PARIS, Feb. 10 (*by mail*)—Before leaving for home, after a six weeks' stay in Europe, T. E. Myers, secretary and treasurer of the Indianapolis Motor Speedway Co., entertained at luncheon, aboard Marechal Joffre's houseboat, on the River Seine, all the French drivers who have competed in the Indianapolis race.

At the close of the gathering the drivers presented to Mr. Myers a table bronze, "La Liseuse," engraved with their signatures.

European entries for this year's Indianapolis race will not be very numerous. Albert Guyot has filed an entry of three cars now nearing completion. Bugatti has some single seaters under way and will send them if results are satisfactory.

It is understood that Pietro Bordino, at present in America, will receive instructions from the Fiat factory to stay over for the Indianapolis race. Antonio Ascari, who last year broke the Indianapolis 500-mile record on Monza track, hopes to come with a 122 cu. in. Alfa-Romeo car.

Mr. Myers found during his visit to European factories that the greatest interest centered around the 1926 race under the 91½ cu. in. rule. Already Delage, Alfa-Romeo and Mercedes have given a definite assurance that they will send teams to America a year hence.

In addition to these, numerous other firms are building 1500 cc. cars for the 1926 campaign. Among the new jobs is a set of 12-cylinder cars built to the designs of Engineer Cappa, formerly with the Fiat racing and experimental department. These probably will be the smallest twelves ever constructed.

Sees Horse Races as Aid to Coast Road Building

LOS ANGELES, Feb. 17—Among all the bills affecting motor vehicles that have been introduced in the present session of the California legislature, none has occasioned as much surprise as that sponsored by Fred Hawes, a member from San Francisco, which would legalize horse racing, provide for a racing commission and set apart 5 per cent of the proceeds from the pari mutual system for the construction of highways.

Mr. Hawes claims motorists are being picked upon to pay for the construction of highways for the use of the general public, and as horse racing formerly was the most popular sport in California and meets would be attended by immense crowds, it would be no more than fair that the public at large help pay for road building.

FINANCIAL NOTES

Deere & Co., Moline, Ill., reports net income for the year ended Oct. 31, 1924, as $1,853,838, greater than the net of 1923, but below the gross income of that year. Reduction of interest charges and administration expenses accounts for the situation. William Butterworth, president, in his statement to stockholders predicts gradual improvement of the implement business. The surplus increased from $8,940,617 to $9,759,456. Quick assets are scheduled at $35,941,673 and liabilities at $9,651,181. Inventories were reduced $3,488,285. Quick assets are $1,635,404 lower, but liabilities are $2,128,387 less. During the year funds were provided to retire $1,500,000 of 10 year notes and to add $1,000,000 preferred stock held by the corporation.

Kelly-Springfield Tire Co. for 1924 shows gross profits of $7,255,746, as against $9,559,804 in 1923, and operating profit of $417,232, against $762,407. After crediting other income and allowing for fixed charges, the company reports a net loss of $1,525,748 for the year, as compared with a loss of $1,166,284 in 1923. The balance sheet as of Dec. 31, 1924, shows current assets valued at $13,707,507, of which $2,590,973 is cash, $6,489,717 inventory and $4,626,715 accounts and notes receivable, less reserves. Current liabilities aggregate $4,429,493, including $3,000,000 notes payable to banks.

Youngstown Sheet and Tube Co. has authorized an appropriation of $2,000,000 for mill extensions in the Chicago district, the forerunner of $6,000,000 more of such improvements there before the close of the year. In making the announcement at the close of the directors' meeting President J. A. Campbell said no financing was considered for the improvements and that there would not be any. The unit to be installed at once will be a mill to roll sheet and tin plate bars and intermediate sizes of skelp tube mills.

Stewart-Warner Speedometer Corp. statement as of Dec. 31, 1924, including the returns of the Bassick-Alemite Corp., shows total assets of $33,149,076, against $28,237,735 at the end of 1923. The profit and loss surplus of the combined companies at the end of 1924 amounts to $12,709,677, against $13,556,824.

C. M. Hall Lamp Co. reports gross business in 1924 of $1,791,149 against $1,849,753 in 1923. Current assets at the end of the year were $1,224,187 and current liabilities $117,441. Surplus was given as $1,673,709, a reduction from $1,754,237 at the end of 1923.

Westinghouse Electric & Manufacturing Co. has declared the regular quarterly dividends of $1 a share on the common and preferred. The common dividend is payable April 30 to stock of record March 31 and the preferred April 15 to stock of record March 31.

J. G. Brill Co. reports net profit of $577,761 for the year ended Dec. 31, 1924, which, after preferred dividends, is equal to $5.34 a share earned on the $4,810 common stock outstanding, compared with $37.95 a share in 1923.

Bassick-Alemite Corp., which is controlled by the Stewart-Warner Speedometer Corp., reports net income for 1924 of $1,137,905, after all charges. This compares with net income of $1,422,584 in the preceding year.

Deere & Co. announces that back dividends on the preferred stock are to be paid at the rate of 4 per cent per annum, instead of 3 per cent. First payment will be made March 2 to stock of record Feb. 14.

Mack Trucks, Inc., has declared the regular quarterly dividends of $1.50 a share on the common and 1¾ per cent on the first and second preferred, all payable March 31 to stock of record March 15.

Edmunds & Jones Corp. directors have declared an extra dividend of 50 cents a share and the regular common quarterly dividend, payable April 1 to holders of record March 15.

Libbey-Owens Sheet Glass Co., Toledo, declared the regular quarterly dividends of 50 cents on the common and $1.75 on the preferred, payable March 1 to stock of record Feb. 20.

Yellow Taxi Corp. of New York reports for the year ended Dec. 31, 1924, net earnings of $619,988, equal to $1.59 a share on the 389,300 no par value capital shares outstanding.

General Motors Acceptance Corp. reports for 1924 net earnings of $2,147,177, against $1,295,789, and a surplus after dividends of $1,167,177, against $815,789 the previous year.

Timken-Detroit Axle Co. has declared the regular quarterly dividend of 1¾ per cent on the preferred, payable March 1 to stock of record Feb. 20.

Pierce-Arrow Shows Gain in 1924 Net

BUFFALO, N. Y., Feb. 18—The Pierce-Arrow Motor Car Co. reports manufacturing profits for 1924 as $1,893,515, compared with $1,732,391 in the year preceding. Net income for 1924 was $751,061, as compared with $372,712 in 1923.

After allowing for prior preferred dividend requirements, there was a balance equal to $6.25 a share on the 100,000 shares of 8 per cent cumulative preferred stock, on which there are due back dividends aggregating 30 per cent. In 1923 the company reported earnings equal to $2.78 a share on the 8 per cent cumulative preferred stock.

As of Dec. 31, 1924, the balance sheet shows net working capital of $11,020,660, against net working capital of $12,042,000 at the end of 1923.

Goodrich Starts 1925 Expansion Program

AKRON, Feb. 18—The B. F. Goodrich Co. announces two important developments as part of its 1925 expansion program.

Plans for a large warehouse addition to the Akron plant are being drawn, it was stated. Details of the acquisition of control of the Ames-Holden Tire Co., Ltd., of Canada, through purchase of a majority interest in the voting stock, were also made public.

The new subsidiary will be continued under the present management, but will be renamed the Canadian Goodrich Co., Ltd. The factories at Kitchener, Ont., form a modern plant with a manufacturing capacity of 5000 tires a day. These factories have been making the Canadian Goodrich tire for the B. F. Goodrich Co.

Gain of 30 Per Cent in Olds 1924 Sales

LANSING, Feb. 17 — Olds Motor Works reports sales for 1924 as the largest in its history and an increase of nearly 30 per cent over the 1923 total. Production increased nearly 10,000 in this period over 1923, and the number of dealerships increased during the year from 1629 to nearly 2200.

APCO SALES GAIN

NEW YORK, Feb. 18—Apco Manufacturing Co. sales were reported by President Thomas F. Wilson as $104,285 in January, as compared with $75,953 in January, 1923.

Inventories Increase in Tire Industry

Manufacturers Have Kept Up Production in Anticipation of Spring Demand

AKRON, Feb. 18—While there has been no marked curtailment of production, the automobile tire manufacturing business has slowed down somewhat in the Akron district, compared with the rapid pace set at the close of 1924 and which continued into the new year.

Spring dating orders, which are usually heavy at this time of the year, are said to be arriving in smaller volume than has been anticipated. This is attributed, not as an indication of unfavorable business conditions, but to a reluctance on the part of dealers to lay in large stocks for future business.

The majority of dealers, it is reported, are striving to keep their stocks at a minimum, carrying only sufficient tires on hand to adequately take care of the needs of customers.

As a result, factory inventories have increased during the last few weeks. Tire manufacturers have kept up production at fairly high levels, in anticipation of a heavy spring business. It is desired to have sufficient stocks of tires on hand to supply the needs of dealers at that time.

Authorities in the industry regard this as only a temporary seasonal lull, and are confident that the tire business will soon resume its upward trend. No change has been made in the plans of manufacturers for an expanding production schedule during 1925.

Sales of balloon tires continue better in proportion than high pressure pneumatics. More balloons are being used on new models by automobile makers.

Orders for balloon tires received by the Los Angeles plant of the Goodyear Tire & Rubber Co. exceed by a wide margin business reported in the same period last year. Sales of balloons in the western territory have been so large in fact that the Goodyear factory is taxed to its capacity to fill dealers' requirements.

The B. F. Goodrich Silverton balloon cord is reported to be gaining in popularity all over the country.

Sales of Firestone, Miller and General balloons continue large, it is learned.

DU PONT DIVIDEND INCREASED

NEW YORK, Feb. 18—Directors of E. I. duPont de Nemours & Co., which derives part of its income from General Motors Corp., have declared a quarterly dividend of $2.50 a share on the common stock, thus increasing the annual basis from $8 to $10 a share. The dividend is payable March 16 to stockholders of record March 3. The directors also declared the regular quarterly dividend of 1½ per cent on the debenture stock, payable April 25 to holders of record April 15.

Stocks Held Down, States U. S. Survey

Federal Board February Review Says This Features Automotive Industry

WASHINGTON, Feb. 18—A general reduction in the price of automobiles and the tendency of manufacturers to keep stocks down is the outstanding feature of the automobile industry, according to the February survey of the Federal Reserve Board, just completed. The automobile industry, the board's survey finds, in contrast to the recovery of many other lines, "continues to operate at a low rate."

The board's comment on the automobile and tire industry is as follows:

Production of passenger cars in December totaled only 178,570—the smallest figure recorded for any month since March, 1922. Manufacturers are endeavoring to keep stocks down and also are, as a rule, supplying dealers with cars only so fast as the dealers can sell them. In contrast to recovery in many other lines, the automobile industry continues to operate at a low rate, and recently several large price reductions have been made.

Dealers' sales to users have been smaller than a year ago. Statistics compiled by the Federal Reserve Bank of Chicago from certain middle western dealers show that the number of cars sold by wholesalers and retailers in December were, respectively, 15 and 13 per cent less than in December, 1923. Stocks of new cars held by dealers were over 40 per cent smaller.

The General Motors Corp. reported that its dealers' sales to users in December were practically the same as in both November and December a year ago. Sales by the company to dealers, however, were the smallest in over two years. Many of the important producers have made substantial price reductions in the last two months, ranging from $5 to $840 per car. Most of the decreases have been on closed cars.

Production of tires and tubes was slightly larger in December than in November, but shipments showed seasonal declines, and stocks increased to the largest figure recorded since early last summer. All three items were considerably greater than a year ago. Rubber prices rose in December to a high level of 40 cents a pound, but in the first two weeks of January quotations dropped sharply to 36 cents a pound.

Despite high prices, December imports were the smallest since August.

Belle City Acquires Johnson Trackpull Rights

RACINE, WIS., Feb. 17—The Belle City Manufacturing Co. of this place, organized in 1890 and a pioneer of the individual thresher idea, also making silo filling units, has acquired the manufacturing and sales rights to the Johnson Trackpull, an attachment for Fordson tractors, developed and manufactured for several years by the A. C. Johnson Products Co. of Racine. C. L. Russell, sales manager of the Truckpull department, becomes associated with the Belle City company.

The device is an independent clutch control crawler attachment. John Reid, Jr., president of the Belle City company, has set out on a large manufacturing and sales expansion program for the entire line of its products. F. Lee Norton, who was vice-president and general manager of the J. I. Case T. M. Co., Racine, for many years, but retired since 1915, has become associated with Mr. Reid in executing these plans. Mr. Norton was one of the founders of the Belle City company.

INDUSTRIAL NOTES

Ford Motor Co. announces that the removal of the engine assembly line from the Highland Park to the River Rouge plant, recently completed, leaves Highland Park as still the largest employer of labor of the many Ford units. With the engine assembly has gone the crankshaft, camshaft and transmission departments to make a continuous process of assembly at the River Rouge. The new engine buildings, which adjoins the machine shop and foundry, has a floor space of 525,000 sq. ft. The assembly of cars for the Detroit district continues in the Highland Park plant.

Cleveland Cliffs Co. announces that one of the largest steel mills and blast furnaces, including a bar rolling mill, employing about 18,000 men, will be erected at Presque Isle, near Toledo. This became known when the company concluded details in the sale of 600 acres there to the Van Sweringen interests. The plans for Toledo's steel mills call for an outlay of $40,000,000, which will be spent by the Van Sweringen interests in their proposed port development.

B. F. Goodrich Tire Co. in France has reduced its capital from 50,000,000 to 31,000,000 francs by canceling 38,000 shares of 500 francs each. The general meeting authorized the directors to increase the capital to the original amount by issuing new shares to the value of 19,000,000 francs.

Moon Motors Corp. has signed a contract with the Murray Body Corp. for 5000 automobile bodies, according to Stewart McDonald, president. He said he expected that his company would establish a production record in the first half of 1925.

Fifth Avenue Coach Co., subsidiary of The Omnibus Corp., reports that passenger traffic on its lines in the 12 months ended Dec. 31, 1924, totaled 61,514,000, an increase of 5,976,882 over 1923.

Salmson Airplane Motor Works has closed its plant in France, making 2500 men idle. Cancellation of a Government order for 50 motors of 250 hp. was given as the cause.

Checker Cab Plants Work at Capacity

KALAMAZOO, MICH., Feb. 17—B. D. De Weese, an automotive executive from Cleveland, has been elected vice-president and director of the Checker Cab Manufacturing Co. and will be active manager of the local plants, having full charge of purchases, engineering and sales outside of New York City, Chicago and abroad. He has arrived in Kalamazoo and assumed the duties of his position.

Another change in the local factory organization is the appointment of J. H. Tuttle to succeed Louis Goodspeed as chief engineer.

Both body and assembling plants are now working at practically normal capacity, and the outlook for business in this country and abroad is unusually good. Several large orders are now running through and deliveries are being made at the rate of about 75 cabs a week.

The payroll exceeds $50,000 a month.

METAL MARKETS

Expansion in the operating schedules of automotive manufacturing plans is reflected in a corresponding broadening of inquiries and orders for steels which are easily recognizable as intended for automotive consumption. Taken as a whole, however, steel consumers show little interest in the market.

The industry's philosophers console themselves with the thought that December and January production having run far ahead of consumption, decline in demand and output until ultimate consumption has caught up is a natural sequel of this condition.

Automotive buyers cover their steel needs in a very conservative way, which acts as a check on the logical readjustment of prices for the more highly finished products on the basis of the recent advances in the more primitive steels. So it is that while 2.20c., Pittsburgh, is looked upon as the ruling price for hot-rolled bars, automotive consumers have no difficulty in placing even small orders for cold-finished bars at 2.80c.

To yield to the cold-finishing mills a differential of $14 a ton, the price would have to be 2.90c. Of course, a good many of these finishing mills have adequate supplies of 2.10c. hot-rolled bars and even lower-priced material.

The sheet bar market, while nominally at $39, is weak at that price level. Where sheet bar mills a few weeks ago claimed that they would have very little material to sell because of the increased demands of their own finishing departments, they now appear very much interested in bids of $38. The first fruit of the recission in fresh buying of finished steel is, therefore, an impressive easing off in the market for semi-finished material.

The sheet market continues ragged. Black sheets were obtainable in some quarters early this week at 3.50c., Pittsburgh or Youngstown. If changed at all, the market for full-finished automobile sheets is a shade less firm.

Some of the more fortunate buyers still have 4.60c. material coming in, and they use this as an argument to break down the 4.75c. price level which has been uniformly adhered to by rollers of late.

Pig Iron.—Automotive foundries have no trouble in buying foundry iron in hand-to-mouth fashion at $22, valley. The market as a whole, is feeble. Bessemer has shed 50c. a ton. Foundries in other than the automotive industries are melting relatively little iron, and the pressure of foreign competition, quantitatively light as it is, acts as a most efficient brake on prices.

Aluminum.—The world situation and domestic market are equally obscure. A shipment of Norwegian metal arrived the other day, the first in some time. Meanwhile the domestic producer appears to be doing a brisk export business. In the aluminum trade one hears the opinion expressed that automotive consumption of aluminum will be lighter in 1925 than it was in 1924. In the absence of any information as to automotive commitments held by the domestic producer, this must be put down as a vague impression rather than as one based on any tangible facts. It seems as though the domestic producer, without any blowing of trumpets, has been able to book the most desirable automotive business, and these consumers, assured of "most favored customer" treatment are keeping prices as much to themselves as the seller. The market for secondary metal is in very light supply and prices, comparable with virgin metal, high.

Copper.—The market is marking time.

Premier Taxi Charged with Operating Illegally

BOSTON, Feb. 17—Officers of the Premier Taxi Co. of Boston were summoned into court by the police here charged with operating 75 taxicabs illegally. The company has a permit for 50 cabs, but the police claim that it has been using 125. A number of drivers were also brought into court and 10 of them pleaded guilty to driving unlicensed cabs. They were each fined $5.

Calendar

SHOWS

Feb. 21-28—San Francisco, Pacific Annual Automobile Show.

March 7-14—Boston, Twenty-third Annual Automobile Show.

March 8-14 — Vienna, Spring Fair.

April 1-17—Sydney, Australia, Royal Agricultural Show. Embraces automobile exhibits.

April 8-14—Bandoeng, Batavia, automobile show under auspices of Netherlands Indies Jaebeurs Fair Association.

April 22-May 7 — Melbourne, Australia, International Automobile Show, under the auspices of the Chamber of Automotive Industries, in conjunction with the Royal Automobile Club of Victoria.

Sept. 21-26—London, Olympia Motorcycle Show.

Oct. 8-17 — London, Olympia passenger car show.

Oct. 29-Nov. 7—London, annual truck show.

RACES

July 26—Paris, Montlhery Track, French Grand Prix.

CONVENTIONS

June 22-27—Summer convention of the Automotive Equipment Association at the Broadmoor Hotel, Colorado Springs, Colo.

S. A. E. MEETINGS

Feb.—Indiana Section, Automobile Finishes.

March—Indiana Section Developments in Transmission.

March 16 — Cleveland Section, Road and Riding Ability, Harry Horning, Waukesha Motor Co., Old Colony Club, Hotel Cleveland.

April 9—Indiana Section, Talk by J. H. Hunt, head of electrical division, General Motors Research Corp.

June 15-19—Summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.

U.S. Seeks License Plate Standardization

WASHINGTON, Feb. 18—"No part of the motor car is given less attention or more abuse than the license plate, its location and its illumination," says a report just made public here by the division of simplified practice of the Department of Commerce. The report represents a study of the license plate and its importance as a safety factor, and emphasizes the existing lack of uniformity which was brought out in many phases of traffic development at the recent National Conference on Street and Highway Safety.

The report has been sent to motor vehicle administrators, police chiefs, traffic and other authorities, as well as to motor clubs, automotive manufacturers and organizations interested in greater safety on the highway. Studies are discussed of the need of standards for plate punchings, mountings, the size of plate, size of numerals, standards for materials, standard codes of numbering, location on the motor car and illumination, as well as of the coordination of color selection.

"Standardization of license plates," says the report, "helps the car builder to provide a standard location for them, a standard method of mounting and a standard method of adequately illuminating them. It simplifies the plate maker's job and ought to simplify the annual task of the State purchasing agent in selecting next year's plates. It ought to save money for all three of these interests.

"Standard location of front and rear license plates is strongly favored by many traffic authorities, as well as vehicle manufacturers. Improved visibility for the traffic officer, better protection for the motorist and greater attention by the manufacturers to adequate illumination for 'night visibility' would follow the adoption of such a standard location.

"Safety in this respect may yet call for front plate illumination."

New Steel Company Organized in Detroit

DETROIT, Feb. 17—Roehm Steel Rolling Mills has been organized here to manufacture hot rolled steels for the automotive industry and other steel users. The company has taken over the plant formerly occupied by the Railway Steel Spring Co. and is now in production. It has a production capacity of 80,000 to 90,000 tons of finished steel annually.

Charles M. Roehm is chairman of the board, and T. F. Thornton president of the new company.

P. W. Brown is superintendent in charge of all rolling operations. Other officers are F. A. Wittman, vice-president, and L. S. Roehm, secretary and treasurer.

Talbott Rubber Reports Large Tire Orders

SPRINGFIELD, OHIO, Feb. 17—Prospects are for a good year in the rubber tire business, according to reports submitted at the annual meeting of the stockholders of the Talbott Rubber Co. B. F. Worrell, vice-president and general manager, says he booked one order on his recent trip for 2400 tires for delivery in Chicago during January and February.

The new board of directors organized by selecting these officers: President, R. A. Houston; vice-president and general manager, B. F. Worrell; secretary-treasurer, S. R. Lucas. These officers, with Creston Arbogast and Frank Kennedy, constitute the board.

The company's factory is located at Ashland, Ohio.

Roamer to Conduct Industrial Campaign

CHICAGO, Feb. 17—The Roamer Motor Car Co. of Kalamazoo, which recently was recapitalized by Canadian financial interests and which had a booth at the Chicago show, is prepared to go ahead with an aggressive and constructive manufacturing and merchandising campaign, according to information given out by representatives of the company at the show.

The company now is in production on the unit, and its schedule will be increased as demand develops. Arrangements are being made by the Roamer company for new dealer connections and further perfections in its merchandising system.

Tire Makers Contest for Export Business

WASHINGTON, Feb. 17 — How the export trade in automobile tires has settled into a scientific economic warfare between a few leading tire manufacturing companies is revealed in a comprehensive survey of the subject made public by the Department of Commerce here. It is shown that at the present time there are less than 12 American tire firms aggressively cultivating export trade, and these, in most cases, have a large foreign personnel.

Without salesmen on the ground to call upon foreign dealers, it is shown in the report that it is almost impossible for a tire exporter to hold his distributors over any extended period; personal contact being essential under present conditions.

Michelin is the dominant factor in the export tire trade. Up to 1922 Michelin exports of tires were made almost wholly from its French factories. The Michelin Co. also has factories in the United States and Italy, and in the last three years has used the Italian plant as a base for exports to an increasing extent, while Michelin shipments from France have also increased.

In spite of the constant depletion of the ranks of American tire manufacturing companies engaged in export during the latter half of 1923, the American makes maintained about the same volume of exports for the entire year as in 1922, exporting 1,363,000 casings in 1923 as compared to 1,326,000 in 1922.

The American share of the total world export trade, however, declined from 34.1 per cent in 1922 to 28.8 per cent in 1923.

New Passenger Bus Added to Mack Line

NEW YORK, Feb. 18—The International Motor Co. has placed in production another type of Mack city bus. This 29-passenger body, built in the company's own shops, is mounted on the standard Mack bus chassis with a 225¼ inch wheelbase.

In design and construction the body is similar to the Mack 196-inch city-type bus of 25 passenger capacity, the chief difference being its greater length.